TECHNOLOGY DEPARTMENT

First Copy

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THE MOTOR AGE

THE AUTOMOBILE AUTHORITY.

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e 5 Cents | CHICAGO NOV. 28, 1901 | Vol. V. No. 12

Who Makes It?

The "IT" means everything in the automobile line. A directory will form part of the Christmas issue and we want your name, address and all details.

There will be no charge for insertion of names and addresses in classified lists. Makers are requested to send at once, a list of all the articles they make which are used by the maker or operator of an automobile.

ADVERTISING RATES:

There will be no advance in the cost of advertising space.

PRICE OF THE DIRECTORY:

The issue will be sent to regular subscribers without additional cost. To others, one dollar.

THE MOTOR AGE

MONON BUILDING
CHICAGO, ILL.

NEUSTADT-PERRY CO.

ST. LOUIS.

MANUFACTURERS

FOR THE TRADE
OF ALL KINDS OF

AUTOMOBILE PARTS

BOILERS
ENGINES
BURNERS
FITTINGS

AND ALL KINDS OF STEAM GOODS.

THE OFFICIAL

Automobile Blue Book

About 300 Pages, 4 Large Colored Maps, 4 Smaller Maps. Sold by Subscription Only

CONTAINS

Complete description of seventy routes adapted for automobile traveling and extending in a radius of 50 miles from New York, Boston, Philadelphia and Washington—with maps.

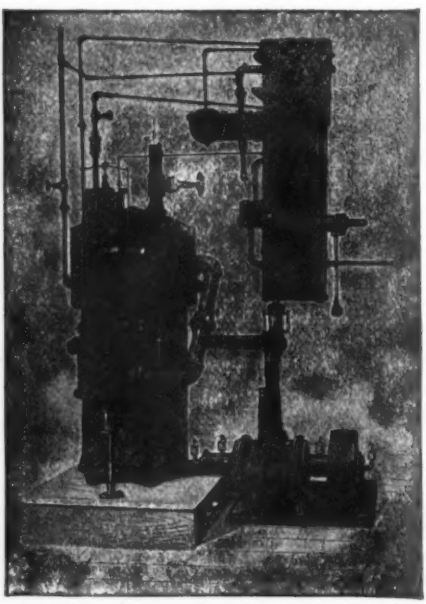
List of 500 automobile stations provided with repair and supply facilities, and telegraphically connected. Special code established.

(These stations have been established by the **Official Automobile Blue Book Company**, and their number will be gradually increased until about 1200 is reached in the territory extending 150 miles or more inland from south of Washington to north of Boston.) Maps specially prepared to show all the routes described and all the good roads in the entire territory, in blue.

Much other useful information too varied for mention.

Official Automobile Blue Book Company

22 Burling Slip ::: New York City.



THE Garland

AUTOMATIC GAS GENERATING APPARATUS

FOR AUTOMOBILE FACTORIES

Any Capacity
Great or Small

In use in steam laundries with small requirements and packing houses using 300 gallons of gasoline daily.

Gas of required density without use of supplimentary air blast.
No condensation.
Vaporizes every particle of oil.

We shall be pleased to figure on the requirements of automobile manufacturers.

GEO. D. GARLAND, - 43 S. Clinton St., - CHICAGO, ILL.

A Fluke

May cause a motor vehicle to make a good showing on a single occasion, but when an automobile stands up and wins five days in succession, it most certainly demonstrates the absence of accidental victory. And when four vehicles stand up and win five days in succession, covering each nearly one hundred miles in a day and being awarded the highest honors at the finish, the charge cannot be supported, in the minds of reasonable men, that the triumph was not brought about by intrinsic merit.

Four first awards were given four WHITE steam carriages for their work in the New York to Buffalo Endurance Contest, promoted by the Automobile Club of America, whose official report can be secured from us, free of charge, upon request. Get a copy and draw your own conclusions from its recitals.

White Sewing Machine Co.

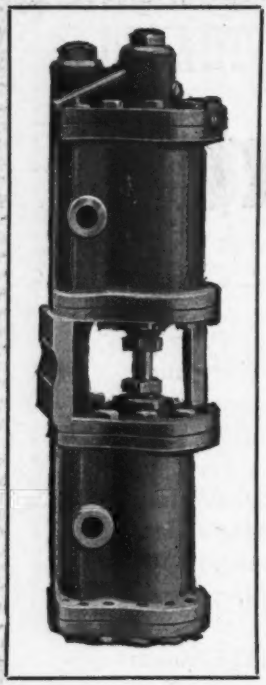
(Auto Dept.) **CLEVELAND, OHIO.**

...NOTE...

There will be a special exhibit of White steam carriages at the New York branch office of the White Sewing Machine Co., 22 Union Square, where all interested parties are cordially invited to call and inspect the vehicles.

...BRANCHES...

22 Union Square, New York, N.Y. 349 Tremont St., Boston, Mass. 212 Woodward Ave, Detroit, Mich
300 Post Street, San Francisco, Cal. 609 Main Street, Buffalo, N. Y.



Victor Steam Air AND Steam Water Pumps

Space required in carriage 9 inches in height by 3 inches in width. Weight 4½ pounds each. Steam pistons 1½ inches in diameter by 2-inch stroke. Water pump piston 1 inch in diameter by 2-inch stroke. Capacity of water pump 1½ gallons of water per minute against 200 pounds boiler pressure. Air pump piston 1½ inches in diameter by 2-inch stroke. Capacity of air pump 80 pounds pressure on fuel tanks or tires. Pipe connections ⅛-inch.

OVERMAN AUTOMOBILE COMPANY,

Room 99, 81 Fulton Street, NEW YORK.

MODEL B

"Toledo"

Possessing all the special and exclusive features of our Model A, with the addition of a Storm Top of the best grade hand buffed leather.

Price, $1000

Send for "Toledo" Booklet. Sent free upon application.

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SPECIFICATIONS:

—Model B.
ne—Ol encased, 3 in. x 4 in. piston valves
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Burner—19 in., with pilot light attached.
Water Tank—Copper, holding 31 gallons.
Gasoline Tanks—Two of copper, holding 4½ gallons each.
Air Tank—Copper, tested 200 lbs. pressure.
Water Pump—New design, attached to engine crosshead.
Air Pump—New design, automatic, attached to engine crosshead.
Hand Water Pump—In combination with steering lever.
Throttle Lever—In combination with reverse lever.
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Gear—Best seamless tubing, 1¾ in. diameter.
Wheels—28 in. wire, nickled spokes and hubs.
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Seats—Solid Panels.
Buggy Top—Strictly first-class hand buffed leather, with storm apron.
Accessories—Lamps, bell, cyclometer, lock for throttle and tools.

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Are built for combined *reliability* and *speed* over any roads. Ask the man who owns one. Our machines can and do *prove their efficiency* in every detail. Descriptive catalogue free.

OHIO AUTOMOBILE CO., - Warren, Ohio.

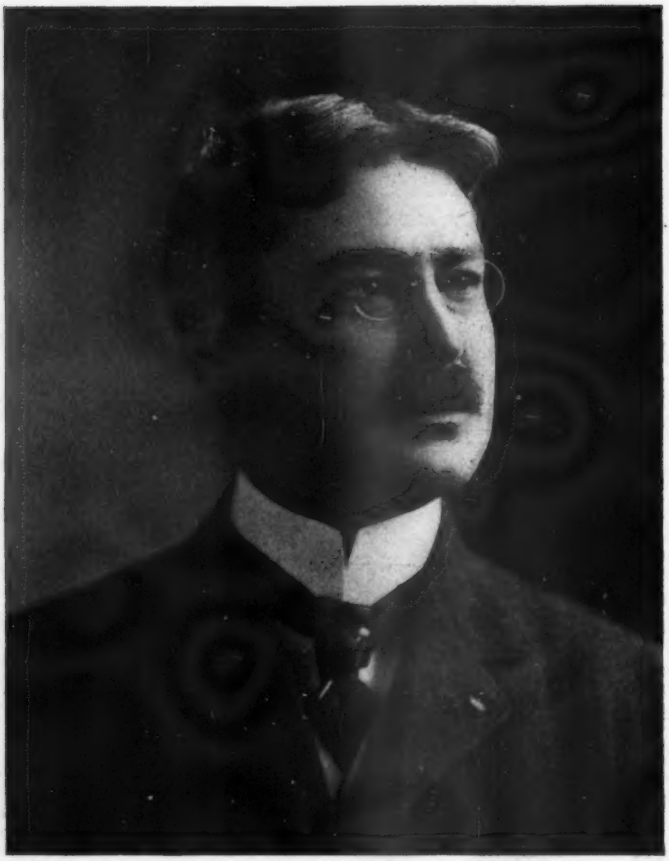
New Kelly Generator

For Steam Vehicles
Improved—Perfect in Every Way

Drip cup unnecessary in starting—Aluminum case over generator—All connections on the outside—Strongly made—Easily adjusted—No flaring or flashing in lighting, even in strong wind. A quick and powerful generator—Main fire valve controlled at seat—Small and neat in appearance and adapted for any machine.

Our new One-Piece Cast Burners have been greatly improved both in power and strength. No wedged tubes in its construction. All in one piece and easily cleaned.

Address, KELLY HANDLE BAR CO., Cleveland, Ohio, U. S. A.



CHARLES HOWARD TUCKER.

A Popular Chicagoan Who Will Conduct a Winton Branch in That City.

CURRENT NOTES AND COMMENTS

New York, Nov. 24.—It was announced at the meeting of the executive committee of the National Association of Automobile Manufacturers on Wednesday, Nov. 20, that its special committee had secured from Manager Frank W. Sanger an option on Madison Square Garden for a week in January, 1903, and an agreement that no other automobile show should be held there before that time. A committee was also ordered appointed by the president, to consist of himself and two others, to confer with the Automobile Club of America, which has managed the two shows at the garden, with a view to a joint management of the next show on some such basis as that on which the Chicago Automobile Club unites with the association in promoting the coming show at the Coliseum in March.

This means that the manufacturers have taken the bull by the horns and will have a share in the direction and the profits of the next New York show and have extended a courteous invitation to the club to appear as joint managers. It was stated at the meeting by those "in the know" that the club was in no need of the show revenues and would deem its pride of promotion and prestige as an organization well satisfied by such an arrangement.

Incidentally it was said that this year's profits had reached very close to $20,000. Last year the club's share was about $6,000. Your correspondent has also been told that the club spent this money partly in furnishing its new quarters and partly in furthering the good of automobiling by $2,000 expended in sign boards, by legislative committees sent to Albany and by the promotion of the endurance run; and that it expects to disburse its share this year in equally unselfish endeavor for the good of automobilism at large.

Further phases of the show question in general were the discussion of a convention at the Chicago show for the consideration of topics not touched upon through lack of time at the New York meeting and a refusal to grant sanctions to the Boston promoters and to the Capital City Automobile Club of Washington, D. C. These cities will, therefore, be restricted to mere local shows, at which local agents, of course, will be permitted to exhibit vehicles and goods owned by themselves. In other words, these local shows will be permitted to entail on the manufacturers no expense through co-operation. In the matter of the South Carolina and West Indies exposition at Charleston, S. C., it was held that its automobile department was in no sense an independent motor vehicle show and so required no sanction, the members of the N. A. A. M. being at liberty to exhibit or not as they pleased.

President S. T. Davis, Jr., was in the chair, the other members present being E. P. Wells, of the Steamobile Co. of America; C. J. Field, of the De Dion Bonton Motorette Co.; D. E. Rianhard, of the Overman Automobile Co.; A. L. Riker, of the Electric Vehicle Co., and Mr. Green, of the Woods Motor Vehicle Co.

The election of officers was the main object of the meeting. C. J. Field and D. E. Rianhard were appointed a nominating committee and their nominations were unanimously elected, as follows: S. T. Davis, Jr., Locomobile Co. of America, president; A. L. Riker, Electric Vehicle Co., first vice-president; C. J. Field, De Dion Bonton Motorette Co., second vice-president; Dane E. Rianhard, Overman Automobile Co., third vice-president; Percy Owen, Winton Motor Vehicle Co., treasurer, and E. P. Wells, Steamobile Co. of America, secretary.

A reply was received from the treasury department at Washington to the association's communication in reference to undervaluations of imported vehicles. It was to the purport that the specific complaints would be investigated and steps taken to remedy the alleged existing evils. In view of this reply it was decided unnecessary to send a delegation to Washington as directed at the Madison Square Garden meeting.

The United States Long Distance Automobile Co., of New York; Grant Bros., of Orange, Mass., and the Autocar Co., of Ardmore, Pa., were elected to active membership.

C. E. Miller, New York; The Automobile Magazine, New York; Jos. Dixon Crucible

Co., Jersey City; Midgely Mfg. Co., Columbus, Ohio.; J. Stevens Arms and Tool Co., Chicopee Falls, Mass.; R. E. Dietz Co., New York; M. Kinnon Dash Co., Buffalo; Hartford Rubber Works Co., Hartford, Conn., and Steam Carriage Boiler Co., Oswego, N. Y., were added to the associate membership roll.

No More Trials This Year

Commissioner Brower, who was responsible for obtaining for the Long Island club permission to race on the Ocean boulevard, has declined to take the responsibility of another trial at present. It will be remembered that a final heat, for the club championship, was to have taken place between the men who made the best time in the various classes, but this was impossible because of darkness. Some of the gentlemen interested were in favor of another trial and applied to the commissioner for permission, but he explained that there would be a great deal of trouble about making the arrangements for policing and so forth and that he did not think it advisable to grant the permission. In consequence the club will recognize Fournier's record as entitling him to all the honors which would have gone to the winner of the final.

Discussing a National Association

Another meeting of the Chicago Automobile Club occurred at the club rooms on Monday evening, the principal business before the members being a discussion of the plan of affiliation proposed by the Automobile Club of America, to consider which a committee had been appointed at the previous meeting. The debate was long and animated. The members made it clear, from the start, that they were in favor of the formation of an association for the government of the sport and the betterment of existing conditions as to highways, legislation and so forth but that they were not quite agreed with the New York club as to the methods to be pursued in forming it. A letter was prepared and will be forwarded to President Shattuck, of the A. C. A., containing a number of suggestions. It is possible that representatives of the New York club will be invited to attend the Chicago show in their official capacities as the guests of the Chicago club, and that advantage will be taken of the opportunity to discuss, more fully than would be possible by correspondence, the local conditions and their effect on the work of the association. The communication to be addressed to the New York club will be in the form of suggestions, for the consideration of all parties concerned, and which are expected to lead to an organization of somewhat wider scope than was intended when the original plan of the A. C. A. was outlined.

The next meeting of the Chicago club will occur on Thursday, Dec. 5 and it is to be something out of the common. An entertainment committee has been appointed and is expected to set the fashion for future events which will be difficult to eclipse. A number of guests are to be invited.

Local Show in Boston

An automobile show, organized and conducted by the Automobile Headquarters, at its new building, Stanhope street, Boston, as a means of introducing its business to the public is now in full blast. It has proven, so far, an excellent means of introducing the goods of various makers to the public and of interesting the latter in the business of the enterprising concern which organizes it. There is no charge to exhibitors or the public. It is an advertisement pure and simple from which the organizers hope, in the end, to transact sufficient business with the public and to secure enough permanent exhibits from the makers at a nominal charge to make the venture as profitable as it deserves to be.

In many respects the show is patterned after the more pretentious ones in New York and Chicago. There is a loan exhibit and there will be other features designed to make the affair pleasant as well as profitable to the trade.

There are between thirty and forty manufacturers represented, and about sixty automobiles shown. Gasoline machines predominate with steam a close second. Quite a number of sales have already been made. The Automobile Headquarters is probably one of the finest automobile buildings in the United States. It is 65 by 93 feet, five stories and basement, with asphalt floors, has its own heat and power plant, a 20-horsepower electric elevator, 8½ by 12 feet, that will lift 4000 pounds. The show is under the management of P. C. Lewis, assisted by his son Ralph, George G. Reed and

A. P. Underhill. The exhibitors are as follows: De Dion-Bouton Motorette Co.; St. Louis Motor Carriage Co.; Knox Automobile Co.; White Sewing Machine Co., Cleveland; Locomobile Company of America; Mobile Company of America; George N. Pierce Co.; Marlboro Carriage Co.; Auto Bi Co., Buffalo; Crest Mfg. Co., Cambridge, Mass.; Waltham Mfg. Co.; Eclipse Automobile Co.; Hopkins Automobile Co.; Diamond Rubber Co.; B. F. Goodrich Co.; American Roller Bearing Co., Boston; Columbia Lubricant Co., Boston; American Torch & Heating Co.; Long Distance Automobile Co.; Elliott Engine Valve Co.; Wheel Within Wheel Co.; E. S. Clark; Boston Automobile Exchange; American Electric Vehicle Co.; Alston Foundry Co.; Stearns Steam Carriage Co., Syracuse; Rose Mfg. Co.; Archibald Wheel Co.; Binney & Burnham Mfg. Co.; Overman Automobile Co., Chicopee Falls, Mass.

Round the World in a Year

Three weeks ago MOTOR AGE detailed the plans of an English resident of Paris for a trip round the world in an automobile and told of his invitation to others to join him. He is now making an effort to interest the French automobile club in his plan and has asserted his belief that if the club will undertake to see that he is provided with gasoline at all necessary points on the route he can make the trip, using a 5-horsepower machine, within a year.

The Chicago Show Plans

Matters connected with the Chicago show are going on swimmingly. During the week track space has been allotted to those who were too late to secure space in the center. About two-thirds of it is occupied and it is likely that all will be gone before the end of the week. There are several applications now pending the settlement of definite locations. The Chicago Motor Vehicle Co. has secured 1,000 feet, Winton 660, Milwaukee 660, and the Baker company and Packard jointly about 1,000. A complete list will be ready for publication at the end of the week.

Skinner's Natural Complaint

Kenneth Skinner is angry at the Long Island club, and not without reason. He spent about $100 for the privilege of taking part in the time trials, asserts that he made the fastest time ever made on a motor tricycle, but was not timed. The same thing occurred in the cases of all the motor cycles, a fact not creditable to the management. The timing was the one unsatisfactory thing about the event, the looseness of the arrangement indicating the need of the assistance of men of experience in arranging events of the kind.

At a meeting of the Chicago club on Monday evening attention was called to the persistent failure of eastern men to recognize the record of 1:15 for a steam vehicle, made by W. L. Hibbard, of the club, at the Joliet races. The club will probably see to it that the matter is called to the attention of the authorities who may, in future, make up the record tables.

More About Studebaker's Truck

The Studebaker company which, as was related last week, has just completed the first of its electrically-propelled express wagons, still declines to furnish any details concerning its construction or the intentions of the concern as to future production. The vehicle was given its first trial in South Bend about 10 days ago and operated to the entire satisfaction of all parties concerned.

For a long time the company has been studying the automobile with a view to manufacture. Some time ago Hiram P. Maxim, one of the electrical experts of the Westinghouse Electrical Mfg. Co. of Pittsburg, visited South Bend and after a consultation with the Studebakers the construction of an electrical vehicle was begun, Mr. Maxim devoting his attention to the electrical features and O. H. Schildback, of the Studebaker company, designing the vehicle with special reference to the purposes for which it was to be used. The result is a wagon built on the plan of the strong, durable and heavy wagons of the express companies but with such additions and modifications as the application of electrical motive power demanded from a standpoint of practical use.

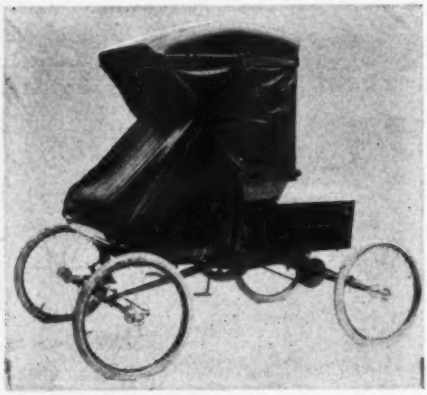
This vehicle is built exceptionally strong and carries under the middle of the bed a storage battery said to be capable of 50 miles on good streets. The maximum speed is 11 miles an hour. The motors are at the rear of and under the box. The power is applied to the two rear wheels by heavy

chains working on sprockets attached to the inside of the spokes about midway between the hubs and tires. The tires are of steel.

Edison is expected in South Bend soon to consult with the Studebakers relative to the use of his new storage battery with these and other electrical vehicles. He has promised them the first one made for such purposes.

The Olds Storm Apron

The Olds Motor Works desires that its vehicles shall be made as applicable to everyday use in winter as in summer and to that end is prepared to supply a storm apron whose position is shown in the pic-



ture. It fits tightly over the curved dash in connection with the top and side curtains so that the carriage is practically enclosed. It can be driven through a driving rain storm without inconvenience to the operator.

American Exhibition in London

A purely American exhibition is to be held at the Crystal Palace, London, from May to September, 1902. The advisory committee consists of a number of members of the American Society in London, an institution not frequently heard of in this country except in connection with British functions, but which is nevertheless a credit to the United States. The Lord Mayor of London appears at the head of the list. The commissioner for the United States is Alfred H. Post, of the Produce Exchange, New York, of whom all the necessary blanks may be obtained. Class 1, for machinery and mechanical industry, will embrace the exhibit of automobiles, bicycles, locomotives and practically everything in the line of transportation.

The Crystal Palace, the largest institution under one roof in the world, will prove an ideal place for the exhibition. Aside from the drawing power of the exhibition itself there are constantly in progress at the palace entertainments of every description, so that the attendance is large. The interest in American institutions and American goods has increased amazingly in the last few years and it may be relied upon that the coming show, for which great credit is due to the American Society, will do much to increase the already phenomenal growth of our exports not only to England but to continental countries, whose buyers will be on hand to investigate the latest things from the United States. The Crystal Palace covers 16 acres of ground beside possessing the most beautiful grounds in Europe, covering 200 acres. During the exhibition a number of the best American shows and entertainments will be added to the regular programme at the palace and one or more of the leading American bands will be engaged.

Claim of Heavy Damages

That there is hardly any limit to the use of the automobile is evidenced by a lawsuit which will some time in the near future come up for trial in the United States Circuit Court of New York. The Yukon Transportation Co. is suing a well-known dry goods firm, which handles automobiles, for damages caused by the non-delivery of two gasoline cars within the time agreed when the order was placed. Some months ago the transportation company ordered the wagons, paying a substantial deposit. The cars were intended for transporting passengers between Dawson City and other points in the Klondike region. When the time came for delivery the manufacturer was unable to make delivery as the cars were not completed. There was a delay for several weeks and when they were finally sent to Alaska, the Yukon River was frozen over and the owners were unable to ship them to Dawson. The company immediately started a suit to recover damages to the extent of $50,000, claiming that by not being able to place them in commission at the time planned they lost

over $500 per day. The dry goods house through which the wagons were sold offered to transport them overland but this was refused as was also an offer of settlement for $5,000. Considerable interest is manifested in the trade to learn how the complainants can prove the daily loss they claim to have sustained.

Tests Fischer's Auto Truck

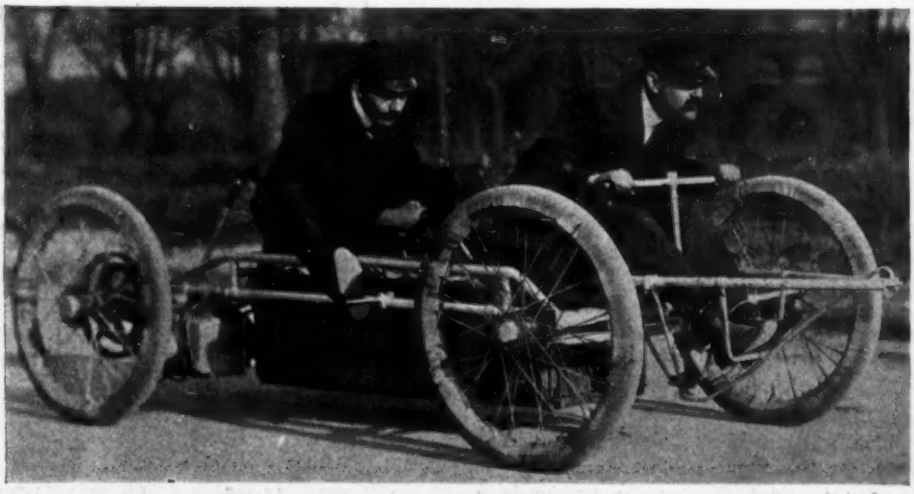
The Fischer Auto-Truck Co. is expected to locate at Middletown, Conn. Concessions have been offered it by the town officials. A test of one of the company's trucks was made there last week. It was sent from New York to New Haven by boat and taken thence, under its own power, to Middletown. At the latter place the truck was run to the freight station, where 4 tons of flour were loaded and it was run up Court street with ease and unloaded in a store house. A little later it was run to the factory of Rogers & Hubbard at Pameacha and 5 tons of ground bone loaded onto it. The operator of the truck wanted to take 6 tons, the capacity of the truck, but 5 was thought to be sufficient by the company. The load was taken up town without a stop on the grades or elsewhere. To carry the same load would have required one four-horse team or two two-horse teams. The expense to the company of freighting goods to the depot is 30 cents a ton, and that is regarded as a very favorable rate. The truck develops between 32 and 34-horsepower.

Meaningless Criticism

Contrary to the dictates of common sense, and without knowledge of the facts in the case, apparently, many of the daily papers, some of them influential, have taken up the late trials at Coney Island as a text on which to base lengthy sermons on the iniquity of allowing automobiles to make high speed on the highways. They lose sight of the fact that the trials were made by special arrangement with the park commissioners, on a track specially policed for the occasion and without the slightest danger to anyone except the operators of the vehicles. Automobilists who have respect for the rights of other users of the roads will join in protest against excessive speed and reckless behavior on crowded thoroughfares, but the hysterical outcry of the press over trivial matters is becoming nauseating. It reminds one of the fear among the old fogy element on the introduction of the locomotive and is equally senseless.

Uncle Sam Believes in Them

It has been practically settled that the mails for the St. Louis exposition will be carried by automobiles. The experiment proved entirely successful at the Pan-American. Other motor vehicles will probably



THE CONEY ISLAND TRIALS.
The Riker Electric Vehicle Which Made a Mile in 1m. 03s.

be included in the St. Louis outfit and it is expected there that some of them will be in use about the first of the new year. Capt. James E. White, general superintendent of the railway mail service; George W. Beaver, superintendent of the salary and allowance division, and J. M. Masten, chief clerk to the first assistant postmaster general, will make the recommendation to the postal department.

With Postmaster Baumhoff the gentlemen visited the fair grounds and the sub-station and they concluded that automobile service would be much of an improvement over the wagons or the street railway mail cars.

Following the first auto to be used, others will gradually be contracted for until a line will be running in each direction from the postoffice. The vehicles will not be bought by the government, but the automobile mail service will be let by contract as the contracts for the collectors' wagons are now let.

Exports of Motor Vehicles

Washington, D. C., Nov. 23, 1901.—The figures for exports of motor vehicles from the port of New York for the week just ended are as follows:

Hamburg: I case motor vehicles, $2,200.

London: 8 packages motor vehicles, $3,-325.

Liverpool: 8 packages auto-vehicles, $13,250.

Rotterdam: 2 packages motor vehicles, $150.

U. S. Columbia: I auto-gun, $2,400.

Vigo-Vigo: 1 hot air motor, $173.

For the month ending October 31 there were exported from the port of Boston, automobiles valued at $2,828.

Dogs and Just Plain Curs

The Cleveland Plaindealer, usually a friend of the automobolist, complains that some of the operators of that city take pains to run over dogs and even boast of the number they have killed in a certain time. If the charge is true, Cleveland automobilists ought to be ashamed of themselves. Such wanton destruction is not right, says the Plaindealer, and it is difficult to imagine that any excuse can be made for it. A vicious dog might be greatly annoying to a bicycle rider, but how can any dog worry the automobile driver? He certainly cannot cause an upsetting of the vehicle, and personally the auto driver is quite safe from his attacks. As for the dog's barking at the chaffeur, that at present would appear to be as inalienable a right as baying at the moon. When the novelty wears off, the dog will lose all interest in the racing wonder, and his bark will be reserved for the next novelty. That a few barking dogs, or a few snapping ones, for that matter, should excite prejudice against the entire canine race, is all wrong. There are dogs and dogs, and some of them are very dear to their masters' hearts. Let the chaffeurs remember this and avoid the unpleasant charge of deliberate and wanton cruelty.

"Reckless Fools" and Speed

The French automobile racing champion, Fournier, who made a mile in less than 52 seconds, with his big gasoline motor, on a straight stretch of smooth boulevard in Brooklyn, says that he will ride a mile in 32 seconds next year presumably with a new and more powerful machine. This shows that he has in mind the highest rate of speed ever attained by a steam locomotive, on a level piece of track, says the Cleveland Leader. Perhaps Fournier can devise an automobile which will enable him to accomplishe this feat. The development of such racing machines has not been going on long and it has been extremely rapid. It would be rash to deny almost any claim of speed possibilities for the auto.

But what shall be said of the effect of placing such tremendously fast and powerful vehicles in the hands of all who may care to buy them? They are not to be run on fenced-in railroad tracks, with danger signs at every crossing, but on the public highways. Of course only reckless fools will ever try for mile-a-minute records on the roads except under special conditions, with arrangements made beforehand for guarding the highway and preventing accidents, but will it be safe to put machines capable of that sort of speed in the possession of all sorts of men? The question of licensing and examining automobile owners and drivers may soon become one of pressing importance.

Anna Runs a Waverley

The increasing popularity of Waverly electric carriages among those of the gentler sex is shown by the large number of this type

of vehicle seen around the streets of the metrooplis, particularly in many of the parks. The picture shown above is a portrait of Anna Held in a Waverly electric runabout.

Elevated Ways for Motor Cars

Why, asks a daily paper, should not the late automobile records lead to something practical? Why, indeed. It is said that a horseless carriage tearing over a country road at 70 miles an hour is out of the question, and that of course is true. It is said that the racing machines are good for nothing but to furnish exciting sport for millionaires. That is not so certain. It has been demonstrated again and again that a good automobile can make over a mile a minute on a road. No doubt, then, it would do still better on a track. Why should we not have elevated automobile tracks connecting the principal cities, after the fashion of the cycle track between Los Angeles and Pasadena? They could be floored with light steel plates and divided to accommodate the opposite currents of travel.

With such an arrangement the dangers of the scorching automobile on the roads would disappear and an effective competition with the railroads would at once come into existence. People who owned their own machines would be absolutely independent of the trains, which they could beat from town to town, and those who had no carriages of their own could hire them or pay for seats in public conveyances.

Anybody could carry passengers over the automobile tracks by paying a small toll, and monopoly would be impossible. In time the tracks could be treated as public highways and made free of tolls.

Imagine a pneumatic-tired omnibus running from Chicago to Milwaukee in an hour and a half, over a smooth steel highway, without jar, jolt, dust or cinders, for a fare of 50 cents per passenger. That is not a dream of a possibility of the remote future. It is a thing within our reach now, if we choose to have it—a thing requiring merely the investment of a certain sum of money.

These elevated highways could be made as beautiful as the elevated railroads in Chicago are unsightly. They could be features of the landscape as decorative as

ANNA HELD, IN A WAVERLEY ELECTRIC.

the old Roman aqueducts. They could accommodate bicycles as well as automobiles, and if we had them we should not need an interstate commerce act to regulate passenger traffic. At least so thinks the man who writes editorial matter for the Hearst publications.

Sport and Trade in Paris

Before knowing whether the Paris-Vienna race will be authorized, says a cablegram to the New York Herald, automobilists are talking of a Paris-Rome contest, also in 1902. The latter will be so royally patronized that interdiction is improbable. The king of Italy will not only give his moral support, but $20,000 toward its success.

At the hill of Gaillon, near Paris, Wednesday, an Osmont motocycle of 8 horsepower climbed a grade of 10 per cent a distance of one kilometer in 46 4-5 seconds.

The prefect of police has relented in the severity of his pursuit of automobilists for excessive speed in the Bois de Boulogne. It is now promised that they will not be arrested for letting out occasionally in the main thoroughfares. The old rules, however, are still in force for roads where there are many vehicles or pedestrians, and the cycle police continue to lie in ambush to pounce upon offenders.

An exposition of automobile, agricultural and other kind of motors driven by alcohol, organized by the minister of agriculture in the Grand Palais, is proving a great success. The hall gives off a rather strong odor of alcohol and the visitor sees blue, red and green flames. There are frequent explosions from escape valves and a continual puffing, as if the motors were engaged in a heavy breathing contest.

The government is encouraging the manlegislation to combat the growing tendency ufacture of alcohol for propulsion and lighting, as it intends to introduce the strongest to drink spirits, and wants to give a new line of business for the existing distilleries.

Tucker and the Winton

Under an arrangement entered into last week the Winton company will shortly open a branch in Chicago and Charles Howard Tucker, who for the last 15 months has managed the local business of the Locomobile company, will assume the management. His resignation has been forwarded, to take effect at the end of the month. So far as is known at the Chicago office his successor has not yet been appointed.

Until 2 years ago Mr. Tucker was engaged in the manufacture of gasoline engines at Providence, R. I., his native city. His knowledge of the business led to his connection with the Locomobile company, for which he came to Chicago in connection with the exhibit and races at Washington Park in September of last year. This introduction to Chicago led to his appointment as manager of the branch.

During his stay in Chicago Mr. Tucker has demonstrated his remarkable ability at making himself popular and useful. He has received, and declined, more than one offer to change his position. He was one of the most active men in the formation of the Chicago Automobile Club, of which he is vice-president, and has become one of the most popular men in that organization, whose members look upon him as an authority on all matters connected with the automobile.

It is understood that the Winton company has decided on a location and will be ready to make an announcement concerning it in the near future.

Madagascar, the French possession in Africa, is quickly getting into the automobile movement. The latest report shows that there are three quadricycles, four tricycles, three small vehicles, three vehicles of different makes, three breaks and seven trucks. Most of them are to be found in Tananarive, the largest city of the island. The roads are good and well kept. Most of the enthusiasts are French officers. There is quite a large army in the island. Cycles are also gaining steadily. Most of them are of French make.

From a recent publication of the Moto-Club, of Belgium, it appears that the Belgium Automobile Club has now 520 members. There are 222 "essence" stations, or depots, all over Belgium and the club has made arrangements with fifty-seven repairers who all have the same tariff for repairing.

As was predicted a week or two ago, the establishment of an automobile news service for the Sunday papers between Phil-

adelphia and Atlantic City by one of the dailies has been followed by other similar attempts to serve the papers to the residents of the seaside resort at their breakfast tables. The Philadelphia Record is the second in line and the machine employed made the first trip successfully though not in as good time as that of the paper which set the fashion.

The Steam Vehicle Co. of America has received so many testimonials concerning the excellence of its Reading carriages that it has decided to publish them in serial form in its advertisements. The first, which appears this week, is from a gentleman in the hilly country of Pennsylvania who speaks of it in the highest terms of praise and tells of rough usage to which it has been subjected without damage. To persons interested in steam carriages these testimonials will be worth reading.

Superintendent Thompson, of the Geneva Automobile & Mfg. Co., resigned his office at a meeting of the directors last week. His future movements are uncertain but he will take time for a rest and then probably devote his time to developing a number of devices on which he has lately been working. Meanwhile the company is negotiating with a first class man for his services as superintendent and expects to push the business the coming year in true Carteresque style.

According to Henri Chevalier latest statistics show that the horse still has a big future despite horseless vehicles and flying machines. In central Siberia there are 85 horses to every 100 of population. In the United States the proportion is 22 to the 100 and in France 7 to the 100. The Siberian proportion is only excelled by the Argentine Republic, where the rate is 112 horses to every 100 inhabitants.

P. H. Haming has resigned the position of treasurer of the Grand Rapids Bicycle Grip Co. and has started manufacturing for himself. He is making a full line of grips which are the result of many years' experience in the business.

In connection with the Tri-State Automobile and Sportsmen's Show, to be held at Detroit from Feb. 26 to March 1, inclusive, and at the head of which is W. E. Metzger, there will be a display of about sixty vehicles. Mr. Metzger reports that all the space has been taken. Among the features will be a racing machine, similar to that introduced for the first time at the Chicago show last March.

Watch the automobile stage line at Sheridan, Wyo. It may furnish an answer to some of the many questions asked as to vehicles for this purpose. This one was made in Omaha and taken overland to Wyoming. It has been tested severely and has so far shown ten miles an hour as an average over bad roads. It is propelled by a gasoline motor.

Fournier has announced that he will be a competitor in the Paris-Vienna race in June. He also stated last week that as soon as the Cincinnati races were over he would devote his attention, for some time, exclusively to the production of the automobile which is to be made under his direction and which, it is reported, is to be known as the American Mors. Why not the Fournier?

The Empire track, on which many of the late records have been made, is to be sold under a mortgage foreclosure and it is likely that it will be cut up into building lots. There was a rumor afloat that a syndicate, composed of members of the Automobile Club of America, would buy it and preserve the track, but so far nothing has come of the matter.

Since the first of November an automobile club has been founded in Denmark. The president, Baron Blixen-Finecke, is a nephew of the king. There are about 100 members. All told there are about 100 automobiles in Denmark, most of which are of German make. The French have not yet tried the market.

Phineas Jones & Co., the well known vehicle wheel makers, have issued a rather unique calendar in colors. It is entitled "Making up his Deposit" after the well known painting by Witowski.

Among the callers at the eastern office of MOTOR AGE last week was L. L. Hull of Clifton, Conn. Mr. Hull has retired from

active business, but he is enthusiastic in his praise of the automobile. He recently sold a gasoline stanhope and is in the market for an electric having room for four persons.

The race between the duke of Abruzzi and Signor Cotelletti, referred to last week, came to a sudden termination. The latter struck a mile-stone while traveling at top speed, smashed his car but escaped without serious personal injury.

The Coleman Automobile & Cycle Co., of Providence, R. I., has been obliged to admit its inability to continue and has filed a voluntary petition in bankruptcy.

The members of the Evansville (Ind.) council last week voted unanimously to increase the speed limit in the city to 10 miles an hour. It had previously been 6.

A local paper reports that the Prescott Automobile Co. has received an order for 100 steam vehicles to go to England.

Among the orders lately received by the American Bicycle Co. was one for a Toledo steam carriage from Buenos Ayres.

SPARKS AND AIR SUPPLY

"When using a sparking device for ignition on a gas engine," asks a correspondent of the Scientific American, "will it run any better or develop any more power by using a large spark or a small one? If so, why? If not, why?

"I am running a 30-horsepower gasoline engine. The gasoline is fed directly into the head of the cylinder. The gasoline is pumped into a small reservoir just outside of the cylinder head and is fed into the cylinder by a small tube (about the size of an eightpenny nail) by the suction of the plunger. The regular way for taking the air into cylinder is from underneath the cylinder. I have changed the air. I am taking it now from the exhaust pipe, which is, of course, hot air. Now, what I wish to know is, do I gain anything in the way of fuel by using the hot air instead of the cold? Do I lose any power by using hot air?" To which the paper replies as follows: "A short, thick or fat spark is best for ignition purposes; the larger volume the spark has the greater quantity of fuel it affects instantaneously, and, consequently, the more rapid will be the flame propagation and the more nearly instantaneous the combustion. The quicker combustion is completed the higher will be the pressure due to it and the higher the explosion pressure, the higher the efficiency of the operation. While these statements are all true as to fact, there is a point beyond which the gain in quickness of combustion due to a larger spark is not sufficient to justify any special provision for an extraordinary size of spark; hence, it is not worth while to make any effort to get anything more than the "fat" spark mentioned. Warm air in connection with gasoline and kerosene gives a higher efficiency in fuel consumption, but reduces the capacity of a given engine, for the reason that a cylinder full of hot air has less oxygen by weight than the same volume of cold air, and the weight of gasoline that can be consumed at each explosion is correspondingly less. The hot air gives a higher fuel efficiency because the gasoline vapor is more thoroughly mixed with it, and combustion is quicker and more nearly complete. But if you are taking hot air from the interior of the exhaust pipe, that is about the worst place you can go for the air supply, because you put back into the cylinder a quantity of dead products of previous explosions, which absorb heat energy from your fresh fuel without contributing anything to the next explosion. It is, in fact, remarkable if you get any explosions at all with exhaust pipe contents mixed with gasoline; you must have a very short exhaust pipe to do this. If, on the other hand, your air supply is drawn through a chamber surrounding a part of the exhaust pipe, but not communicating with its interior, this is the best possible practice that you could follow."

FOURNIER RIDES AT CINCINNATI

Cincinnati, O., Nov. 25.—The local club's first automobile races, postponed from Saturday on account of rain, occurred this afternoon. The postponement resulted in a small loss to the club, whose members, however, are well pleased with the attendance of 2,000 people, without doubt the most select assemblage that ever graced a racing ground in Hamilton county. While the sun shone the weather was chilly, a cold wind blowing. Though the track had been rolled and was as smooth as a table top it was a trifle too soft for extreme speed. Fournier was distinctly the drawing card, but great interest was displayed in the three 5-mile contests by machines owned and driven by local gentlemen. It was announced that the racing would begin promptly at 2 o'clock, but when Fournier arrived at 1:45 he found that a part of the pump of his machine had broken. Captain Howard Rodgers inspected the injured part and announced that it could be repaired at the Bullock electric plant in East Norwood, about a mile from the track, and thither he hurried with it. On his arrival at the plant he telephoned over that the piece would be in shape in time for a few miles spin. Fournier in the meanwhile betook himself to the clubhouse and watched with much interest the contests between the locals.

The officials recovered from the fit into which they had been thrown by the announcement of the accident to Fournier's machine, and took up their duties shortly past 2 o'clock.

The first race was for steam machines of 3½ horsepower, and had as its entries Messrs. Howard S. Miller, Emmet P. Gray, John Duttenhoffer, Fred Stenger and William Martin. A shot sent them on their journey and there was applause from the grand stand, now resplendent in fine feathers, gay gowns, and rich coats. Fred Stenger, rounding the second turn for the straight-away on the back stretch, feeling safe in the lead when his machine shot across the track, turned a complete somersault and lay pumping and shaking near the outer rail. Stenger and his companion had described semicircles in the air and landed on the track several yards away, the former on his head and the latter sprawling on his stomach. Neither suffered more than a severe shake up. The remaining four safely journeyed the 5 miles, Gray being the winner of the first prize quite easily from Martin, who had held the lead for the first 2 miles. The time was 12:04.

The second race was for gasoline machines at 5 miles, and had six entries. The Renault machine, which Mr. Schmidt had entered, was sold in New York last week to Foxhall Keene, and was, of course, not on the grounds. Harry Sumner did not reach the track in time with his Lunkenheimer machine, so only the machines driven by Max Fleischmann, Carl Baumann, R. Meyer and Carl G. Fisher started. The race was won by Meyer, with Fleishmann second in a highly exciting finish with Fisher. The time was 8:32¾.

The third race was for gasoline carriages and the distance 5 miles. The contestants were Meyer, Fleischmann, Fisher and Harry Sumner. It went to Meyer with Fisher second. The time was 9:24.

There was yet some time before the repair of the injury to Fournier's machine, so to keep the crowd from growing impatient Emmet Gray came out with his machine and went for a mile against the track record of 2:08 made in the races on Enquirer Day—the first automobile races in Cincinnati. He won the applause of the throng when the time—1:55—was announced for the mile. It was a really excellent exhibition by a very light machine, but it was put to the rear several seconds when the famous Frenchman, with his massive blue painted machine, popping with the explosions of the engine, began to encircle the track a few minutes later.

Under the mechanical eye of Mr. Rodgers the pump had been repaired, hurried over to the track, quickly placed in position, and then Fournier mounted to the seat, Max Fleischmann hopped on behind and away they sped.

What a terrific pace! Out through the

gate and onto the track the big vehicle fairly leaped. Cheer after cheer went up from the throng. Fournier turned the vehicle right way of the track, paused a minute for a second inspection, and then, waving back the crowd the burden glided by the starter.

With a wave of the hand, which cost him his cap, Fournier indicated that he was ready, and at 4:40 Fournier was away on the first mile of what the programme designated as a 15-mile journey, but which, on account of the hour, had been reduced to 10 miles.

The first mile was passed in 1:11 1-5, and a great cheer rang out. The next was in 1:09; likewise the third. The fourth was in 1:08 4-5.

"He'll break the record, sure," shouted scores.

The fifth was in 1:08 1-5, and they were certain that the next would be a record breaker. But it was a second slower, and the seventh was made in 1:10. The machine was sliding on the turns, spreading away from 3 to 5 feet from the position originally taken near the inner rail.

The eighth mile was made in 1:11, and, to the surprise of every one, Fournier quickly pulled up the machine and shot it through the gate at the clubhouse and around under the grand stand.

The throng thought the machine was broken. Not so. It was all right. But Max Fleischmann, from his position on the rear of the machine, had made a mistake in the count of the miles. The first four he counted as six. Wonder that he could count at all. The total time for the 8 miles was 9:16 2-5.

The throng was satisfied, even though the record was not broken.

Fournier was paid $750 for his performance, expressed himself as highly pleased with the treatment he had received in Cincinnati, and was profuse in his thanks to the members of the automobile club for the opportunity to make this visit and for the royal manner in which they had entertained him.

Fournier said that Oakley Park track is admirably adapted for automobile racing, and he was confident that he could have lowered the record had not the rain of Saturday softened the track.

PROBLEMS OF FREIGHT TRANSPORTATION

BY EDWIN W. ADAMS.

The following interesting paper on the important question of transportation was to have been read at the recent convention of the National Association of Automobile Manufacturers, but that topic was not reached, owing to prolonged discussions of other subjects, and therefore the paper was not presented. It was written by Edwin W. Adams, connected with the house of Jimenis & Co., New York:

The subject of the application of automobiles to business transportation is one that has been well threshed by automobile publications theoretically, but up to the present time there have been no practical results. Occasionally we read of an experiment made by some transportation company with a certain make of automobile, and again is seen an illustration of a truck or wagon, with a description of its wonderful capabilities, which description leads us to believe that the vehicle millenium has been reached. Shortly some fatal defect appears; the machine is never heard of again by the public, and our patient horses continue to draw their heavy loads, with no relief apparent. That the brains of our manufacturers are at work on this serious problem there is no question, and that they will gradually overcome the obstacles is equally certain, but to the public, judging only by something actually accomplished, there seems little progress. The introduction of a business automobile that "almost" fills the bill, but does not reach all the requirements, may be a great step forward in the eye of the manufacturer, but to the practical business man it, being not altogether reliable, is but a failure.

NO THEORIES SATISFY BUSINESS MEN.

The pleasure automobile is "sui generis." A ride for recreation may be occasionally taken without interruption or stoppage for repairs, but are there many even short tours taken during which a delay of some kind does not occur? This may be annoying to the drivers and guests, but no real damage results, and annoyance is hard to appraise in dollars and cents.

The province of the business automobile is to transport its burden to railroad stations, steamship docks and like points with regularity and reliable dispatch, the lack of which reliability in morals, law or business, cannot be excused by any general 'mobile damnation. The business public is not prepared to 'try out" any theory—proving experiments in this line, as the drivers of pleasure automobiles have been doing for the past few years, but demand facts, FACTS, proved and provable FACTS. The ories are for the inventor and speculative manufacturer, but when the business man attaches his name to a check he must needs have a fairly clear idea of what he is getting in exchange, or he will not long be a business man, and until the proven facts have demonstrated their practicability, the manufacturers, themselves being of the family of business men, will realize that it will be the part of discretion to remain in the background quietly experimenting rather than to be suddenly haled to a court of law for getting money under false pretense.

RELIABILITY QUITE ESSENTIAL.

Railroads run by schedule; steamships, freight and passenger, sail at stated hours; the fact of faulty ignition, punctured tires and such auotomobiling ills may provoke mere "cuss words" in recreation, but they will not bring the steamship St. Paul back to her dock, nor deposit you, with your wife, babies and bandboxes, on the promenade deck as she passes Sandy Hook. If you have contracted to deliver fifty cases of Brown's Elixir of Life at Broad and Market streets, Philadelphia, to be ready at 7 o'clock on the morning of the annual awakening, you cannot plead a hot box in New York to prevent a postponement of the ceremonial and another year of lethargy. Transportation must therefore be prompt and reliable, otherwise the motor will never recover from the effects of the failures of the first public experiments, and further trials will be correspondingly prejudiced in advance.

That business automobiles will not have

occasional accidents is too much to expect. The best of our locomotives, running on even track, as they do, will at times give way in a vital part without warning, although scrupulously cared for; machinery in the ocean greyhounds, with their score of able engineers and assistants, will frequently fail in mid-voyage, but the merchant who must ship his goods and wares at a given hour and the passenger who must reach his point of departure at a certain minute, should these requirements not be filled, would be less patient than probably in any other circumstances. So it is well to look facts in the face and be prepared to overcome them before annoying the public with "rigs that will not run."

ENTHUSIASTIC RECEPTION AWAITS IT.

The field for a business automobile that will answer the many requirements demanded of it is undoubtedly one of the largest before any manufacturer of any article today. The public is ripe for such an invention, and would respect a practical business machine far more than pleasure automobiles, which they look upon as a rich man's toy. That a propelling power which is indifferent to weather or climatic conditions is superior to animal, which needs a sunbonnet and wet sponge in hot weather and hot whisky and woolen blankets in cold, is axiomatic, and the business world is intently peering into the future, waiting to give a warm and enthusiastic reception to a practical, serviceable, reliable and common sense machine. It is no doubt easy enough for a layman to say what is required, but there his ability ends; it is for the manufacturer to do the rest. As the trolley car supersedes the horse car, so will the truck automobile eventually take the place of the truck horse, and the field is relatively far larger.

Both France and England, particularly the latter country, have given much attention to the perfecting of the commercial motor, and have met with more or less satisfactory results. The excellent highways of the countries named have naturally assisted in the advancement of the industry over this country, but the manufacturers here need not hesitate on account of the apologies for roads that exist in our rural districts, as the bulk of transportation to which business automobiles will be applied will be over the highways of our cities and towns, most of which are sufficiently good to prevent any great obstacle.

A PROOF OF THE DEMAND.

One instance of a successful business truck can be recorded in private experiments of a leading express company, with headquarters in this city. These exhaustive experiments have resulted so satisfactorily and have shown such economy over horsepower that orders have been given for a large number of trucks to be finished as quickly as possible, and it can be stated on the most reliable information that within a year, or at least as rapidly as sufficient vehicles can be finished, the entire present horsepower will be superseded by the steam truck, and yet before this scheme is actually in effect or even the second wagon completed this company is fairly inundated with letters from every section of the country making inquiries, desiring to investigate, asking for details of expenses, etc., and in every way manifesting the liveliest interest in this first practical machine. As this company has conducted its operations in an experimental and private way, with no efforts to make public the results, but rather the contrary, the extreme interest of the public and the eagerness to ascertain results is indicative of the willingness of the business world to take up the matter as soon as our manufacturers can give them what is required.

VOLUME OF WORK ASTOUNDING.

It is estimated that the express companies of New York alone transport annually over its highways between 500,000 and 600,000 tons of freight. An effort has been made to estimate the quantity of freight transported by the trucking and private firms outside of the express companies, but the effort was abandoned as beyond the reach of reasonable computation without an exhaustive investigation. Sufficient data was secured, however, to show that the quantity reached into some millions of tons annually, and that some 400,000 horses were used in Greater New York alone to move this monster mass. Multiply the work done here by that done in other large cities and towns, and the result is so stupendous as to fairly astound the manufacturers with the work there is before them.

HOME MARKET IS FERTILE.

Our manufacturers are already looking to

foreign countries with covetous eyes, but it is well to realize that the domestic trade is more inviting, not only by reason of the demand which already exists and which will take years to satisfy, but also the fact that the coal and gasoline fuel so far demanded can be had in almost any part of our country at comparatively light cost, and our people have the means, or the practicability having been proven will possess themselves of the means, to purchase that which means progress or will assist in their advancement, as they are essentially practical and progressive. Prove the advantage and here is your market. Therefore, with such a field, ready tilled and with fertile soil, right at our doors, it would seem like a waste of present energy to struggle for foreign business.

In considering foreign markets it must always be borne in mind that obstacles will vary with the country, from officials jealous of the inroads of superior foreign manufactures to the benighted coolie who jumps into the sacred Ganges to escape this new manifestation of the devil.

DIFFICULTIES OF FOREIGN BUSINESS.

Three requirements are essential for a successful foreign motor introduction: First, fairly good roads; second, opportunity for securing fuel at prices not prohibitory, and third, the ability of the inhabitants to purchase. This combination is not always easy to find abroad; again, there must be added the obstacle, additional freight to foreign countries and the duties that must be paid. Passing superficially, take India, for example: That country has magnificent and extended highways and is a country eager and anxious for rapid transit. It has a large official and leisure class of inhabitants, peculiarly able to indulge in the pleasures of automobiling, and a climate not only inviting but almost necessitating some motive power other than the animal. Yet the laws of the country are such that while they do not specifically exclude gasoline and kindred articles which the present day motor must have, the rules and regulations of the harbors amount to practically definite prohibition. That this state of affairs will be changed in the future there is no reasonable doubt, and it might be wise for your organization to devote surplus energies to this end for future benefit. In the meantime it would seem judicious to solve the problem here, as complete success here will perforce bring complete success elsewhere, and satisfactory foreign business become a natural sequence. There can no harm arise from keeping watch on the growing demands and peculiar requirements of other countries, and thus be ready to take advantage of them opportunely, but should the problem be satisfactorily solved here and our manufacturers offer to the public what they demand and are anxiously awaiting, foreign markets will need no fostering.

No one particular style of business automobile will answer the demand. The different merchandise to be transported over varying roads and in different localities and climate, and the almost endless variety of conditions which must be met are obstacles which will require intelligent thought to conquer, but the prize is worth winning from a material standpoint, and he who solves the problem will also be a benefactor to humanity and to the brute creation.

It is being fairly well conceded that to get anything good, serviceable, practical; to get it of the best; to get it at the lowest prices consistent with proper manufacture; to get it for delivery at the moment required, this glorious "Yankeeland" is the place to come for it. Witness our shipments of coals to Cardiff; our steel and print goods to Manchester; our rails to London; our cotton to China; our breadstuffs to St. Petersburg and Hamburg; our sawmills to Patagonia; our lumber to Australia; our mules and our needles to Africa and India; our yachts to the emperors and warships to the czars. These are facts—great, grand, glorious facts. And so I say, gentlemen of the National Association of Automobile Manufacturers, perfect the automobile so that when the high and mighty mandarin, or the sultan of all the Turks, eventually desires to arrive anywhere, he will need but an American motor to concentrate the wish into reality.

COMPRESSION, IGNITION AND SPEED

BY E. W. ROBERTS, M. E., IN THE GAS ENGINE.

The relation of the three subjects which form the title of this article appears to be understood but imperfectly by the average disciple of gas enginery. This is particularly the case with the relation of compression to speed. Nearly everyone who has experimented to any extent with high speed engines is aware that the higher the speed the higher is the compression that may be employed without deleterious results. But just why this is true is a puzzle to many.

It is known that when a certain temperature is reached in the mixture of fuel and air that it will take fire without the assistance of an electric spark or other of the usual forms of ignition. As the temperature of the charge is dependent upon the pressure of the compression as well as to the heat imparted to it by the surrounding parts of the engine, other conditions being equal, this ignition will take place at the same point in the stroke each time. If the speed of the engine be increased this point of ignition will, if changed at all, become later, owing to the fact that not so much heat can be imparted to the charge from the cylinder walls during the interval between suction and ignition. Therefore the ignition due to compression would have at least no greater lead at the higher speeds.

It is a fact well known that with increase of speed it is necessary to increase the lead of the ignition in order to give time for full inflammation of the charge before the piston starts on the expansion stroke. It will also be seen that if the ignition due to compression does not lead the regular igniter, no trouble with it will be experienced. It will also be seen that the lead due to compression will increase with increase of compression, and hence the higher the piston speed the greater the allowable compression. It has been remarked to the writer when explaining the nature of this relation that it would be seemingly difficult to start an engine having high compression. This difficulty becomes more imaginary than real when it is remembered that the engine is comparatively cool when it is started, and that it usually has the compression relieved.

Another point worthy of consideration with reference to the subject of high compression is the design of the parts which project into the compression space. Long are so often found in connection with piston and slender arms, bolts and studs, such as igniters, do very well with low compression, but as the compression is raised they are prevalent causes of premature ignitions. It appears to be an established principle among the most experienced of our gas engine designers that such projections should invariably be placed in the path of the incoming charge, in order to prevent overheating. A few designers take the stand that the igniter terminals should be placed in the path of the exhaust gases in order to keep the soot burned off them. This contention is very well in theory, but the writer's experience points to an opposite effect, especially where high compressions are employed.

It is a fact that fairly slender igniter terminals have given no trouble when placed in the inlet valve casing, and even springs have been known to last fairly well in that location.

The writer knows of an engine that was not in the least troublesome until the compression was raised, and then the shank of the movable electrodes would burn off in a few weeks, the corrosion being somewhat similar to that produced by acids. The most peculiar fact about this particular case was that the corrosion took place inside the sleeve through which the electrode projected into the cylinder.

It is true that increase of compression brings its attendant troubles, and the ordinary man is apt to decry high compression for this very reason. Would it not be better to meet these new conditions by the changes in design that are called for? Do not attempt to meet the troubles half way, but attend to them all. Slightly increase the cooling capacity of the water jacket, increase the bulk of the igniter terminals and place them where they are subject to the cooling influence of the fresh mixture, and above all things keep projections off the head of the piston, as no part of the engine is less under the cooling influence of the fresh charge and the water jacket. It is a good plan also to look the compression space over closely and take off all fins and sharp corners that are likely to get overheated and assist in producing prematures.

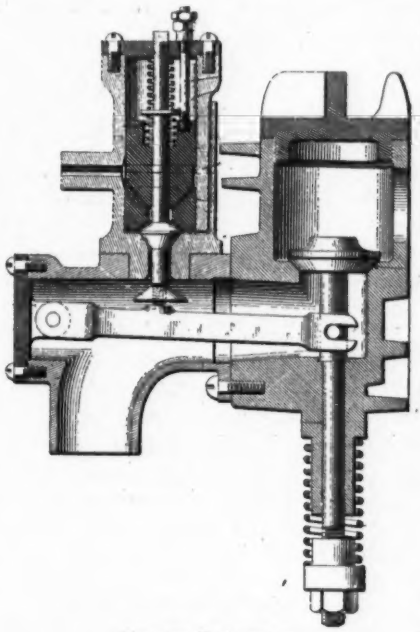
LATE EFFORTS OF DESIGNERS

Among the patents lately granted is one to Charles E. Greuter, of Holyoke, Mass., assignor to the Holyoke Automobile Co. This invention consists principally of what may be termed a measuring valve, whereby the quantity of liquid gasoline to be admitted at every suction stroke of the engine is regulated to a nicety. The device may be made as an attachment or may be an integral part of the engine, though it practically necessitates a mechanically opened admission valve as the resistance incident to the operation of the measuring device would seriously interfere with the action of the poppet valves commonly used in this connection.

Leading to the seat of the inlet valve is a passage through which the air is drawn and during its progress mixed with the required amount of gasoline. Within the mixing chamber is a lever, fulcrumed at one end to a lug projecting from the shell of the chamber. The free or swinging end of this lever is forked to straddle the stem of the inlet valve and the arms of the fork are slotted to receive a pin, which passes through the stem and projects on opposite sides thereof. By reason of this connection of the lever with the inlet valve or its stem, it follows that when the inlet valve rises or falls the lever must do the same.

Rising from the intake pipe, but conveniently made, is a separate part and attached thereto is a secondary shell or casing in which is arranged the valve by which the delivery of liquid gasoline is controlled. This shell or casing is considerably larger than is the valve and within it is placed a plug smoothly fitting the inside of the case. Secured to the case is a lateral arm to which is secured the supply pipe from the gasoline tank. Opposite, or at the height of the inner end of the passage, the plug is provided with a circumferential groove or channel of vertical measurement greater than the diameter of the passage, so that it may communicate with said passage even though raised or lowered somewhat from its normal position.

The valve for controlling the gasoline feed has a stem which passes axially through the bottom of the shell and rests on the lever previously described. The valve is formed with two faces, one above and the other below, each beveled to fit a seat of like form. The lower seat is formed in the bottom of the shell while the upper is formed in the bottom of the plug. The opening in the plug, through which the valve stem passes, is enlarged for a short distance above the valve seat therein and the same is true of the opening in the bottom of the chamber for the same purpose.



Greuter Carbureter.

The object of this is to form a space for the passage of the gasoline into the mixing chamber below. The space thus formed in the plug communicates by holes with the circumferential groove in the plug and hence with the inlet passage from the gasoline tank. On the valve stem, some distance above the top of the plug, is an annular enlargement above which is placed a spring which tends to hold the valve to its lower seat. Beneath the enlargement is a second spring of less strength than the upper one, which tends to press the plug downward toward the lower end of the shell yet permit-

ting it to be raised or lowered without affecting the position of the valve or its stem.

For the purpose of vertical adjustment of the plug a rod is attached thereto which extends upward through the top of the shell and is provided with a nut and jam nut by which the plug may be raised to and held at any desired elevation. When the plug is raised a space is left between its lower end and the bottom of the chamber, which becomes filled with gasoline when the valve is seated in its lower position. When the valve is raised during the suction stroke of the engine this liquid escapes into the mixing chamber, where it is taken up by the inrushing air, forming the explosive vapor.

The purpose of the upper valve seat in the bottom of the plug is to cut off the flow of gasoline into the measuring space when the lower valve is open and the movement of the valve from one position to the other is sufficiently rapid that no considerable amount will flow in during the movement of the valve. In order to facilitate the disposition of the liquid gasoline on entering the lower chamber a cone shaped spreader is provided at the lower extremity of the valve stem.

In the matter of adjustment the amount of gasoline is governed by the position of the plug in relation to the bottom of the chamber and the consequent capacity of the measuring space. This is regulated by means of the above described rod passing through the top of the chamber. There is no variation of the quantity of air, a full charge being admitted at all times.

White's Steering Gear

Paul H. White, of Indianapolis, whose name is familiar in connection with preparations for the manufacture of steam trucks, is the designer of a steering gear that, in addition to being non-retroactive, is designed to relieve the framework and steering connections from the shocks incident to obstructions met by the steering wheels and confine all strains of this character to the front axle and immediate connections. There is provided a screw rod longitudinally secured to the axle, and slidably secured to the axle is a coupling block, to which is rigidly attached a threaded sleeve or nut, engaging with the threaded portion of the screw rod. From the coupling block extend connecting rods, secured at their outer ends to the arms of the steering knuckles at the ends of the axle. As a means of operating this device there is attached to the end of the screw rod a sprocket whereby chain connection may be made to any convenient part of the vehicle. As the White Steam Wagon Co., with which Mr. White is connected, is a manufacturer of heavy trucks, it may be readily inferred that this device is intended for that class of vehicles. It should be effective in that connection.

A Differential Speed Gear

One of the most unique arrangements for speed variation is that of Ezra E. Brown, an American resident of England. It is a combination of well known forms of planet and friction gears so arranged that there is but a light load on the friction gear; in fact the motion derived from this source is in the nature of a release rather than a drive up to the point of reverse and shortly after this point the frictional arrangement is cut out and a positive clutch is automatically put into action to take its place.

In carrying the invention into effect a worm, a, is fixed on the driving shaft which, in motor vehicle construction, might conveniently be a continuation of the motor shaft. This worm gear engages with a gear, c, mounted axially on the shaft, h, to which it is desired to impart a variable speed and which will be hereinafter referred to as the driver shaft. Fixed to the worm-wheel, c, or formed integral therewith is a disk, to which are secured pins serving as axles for a number of planet wheels which revolve freely on their respective axles and mesh with a sun gear fixedly attached to the driven shaft and with an annular gear, k, which is rotatably mounted on the driving shaft.

Fixed to the wheel, k, or forming an integral part of the same is a worm-gear, l, engaged with a worm gear, m. The pitch of the worm-gears, l and m, is such that on a revolving motion being given to the wheel, l, it would be nearly or quite capable of revolving the worm, m. If motion of the driving shaft be imparted through the gearing described, to the disk, d, carrying the planet wheels, the result will be to rotate the sun gear, g, provided the annular wheel, k, is stationary, it being well understood that in this form of sun-and-planet gear

the annular wheel forms the fulcrum or point of purchase whence the motion of the planet wheel rests upon the sun wheel. The annular wheel, k, is held stationary so long as the worm-gear, l-m, fixed thereto, is not permitted to rotate. Suitable means being provided to rotate the worm-gear, l-m, thereby releasing the annular gear, k, at any desired gradation of speed in the same direction as that in which the disk, d, revolves, it will be readily seen that complete control is obtained over the resultant speed of the sun gear, g, and thereby that of the driven shaft, h.

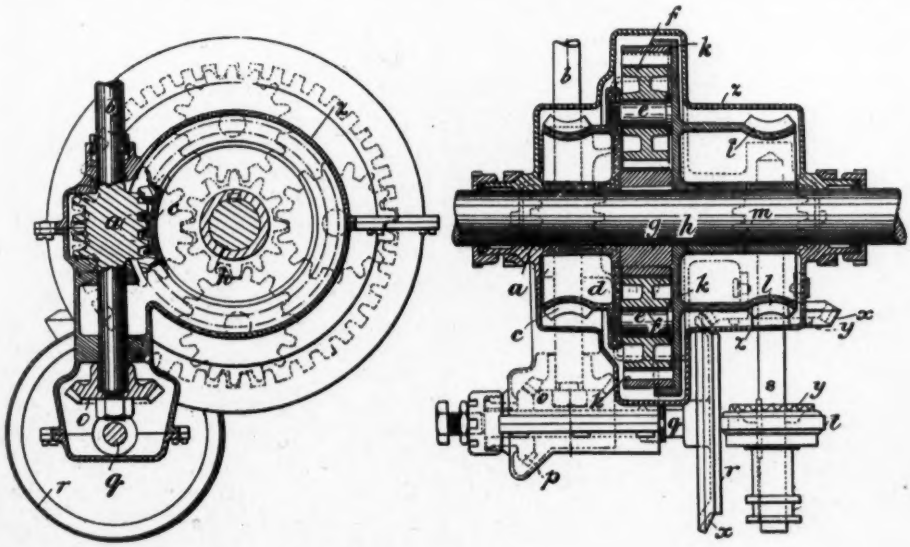
For controlling the speed of the annular gear, k, the driving shaft is connected by the bevel gears, o-p, to a shaft, g, at one end of which is a friction disk, r. Upon one end of the worm shaft, s, upon which the controlling worm, m, is mounted, is provided a friction wheel whose periphery is in frictional contact with the friction-disk, r. The friction wheel is arranged to slide longitudinally along the worm-shaft, being feathered thereto. In a prolongation of the hub of the wheel, t, is an annular groove provided as a means of engagement with a lever, or other device for controlling the longitudinal movement of the friction wheel, t, along the face of the disk, r, whereby the speed of rotation of the shaft, s, and consequently the gear, k, is varied at will.

As the rotative speed of the gear, k, is increased the speed of the driven shaft is reduced till a point is reached whereat the speed of the gear, k, is such that the sun gear will remain idle. If the speed of the gear, k, is still increased the gear, g, will again be rotated but in a reverse direction. Up to the time of reversing the direction of rotation of the driven shaft the tendency is to assist the rotation of the shaft, s, thus relieving the work of the friction gears but after this point the work of this gear is greatly increased and in order to relieve it the clutch, y, is provided to engage with the bevel gear, x, which under normal conditions runs idly on the shaft, s, being in mesh with a bevel gear on the periphery of the disk, r.

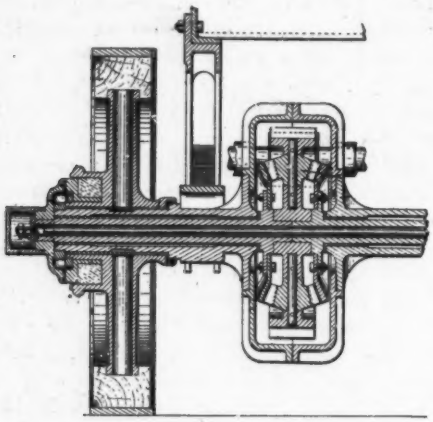
An objectionable feature of this device is that when it is desired to hold the gear, k, stationary, the friction wheel, t, is held in contact with the center of the disk, r, which would give the desired result but would soon result in a flat spot on the face of the wheel, t. A far better way would be to concave the central portion of the disk, r, and provide a stationary brake with which the periphery of the wheel, t, would come in contact at this point. Beyond this feature there is no reason why this device should not provide a simple and effective single lever speed control for a gasoline vehicle.

An Elastic Driving Gear

Henry Spurrier, an English constructer of motor vehicles, has recently designed a



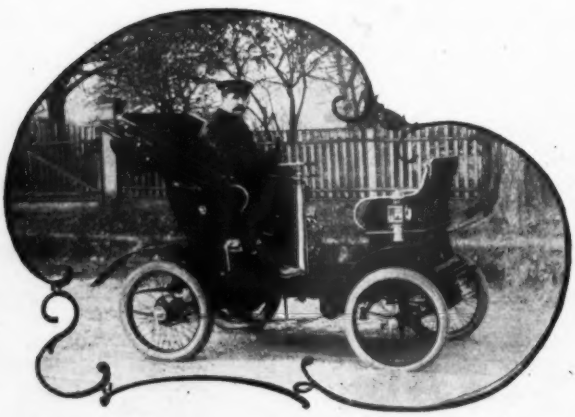
driving gear wherein an elastic connection is obtained between the driving shaft and the wheel. The driving axle is of the divided type and is actuated by a compen-



sating gear of the form in common use. Surrounding this axle is a tubular portion of the frame on the projecting ends of which the driving wheels are rotatably seated.

The hub of each wheel abuts, at its inner face, against a shoulder on the axle and is of such thickness that its outer extremity is a little short of the length of the axle. There is on the outer face of the hub an annular projection with integral radial wings on its inner face. Within this and seated on a tubular projection on the hub is a flanged sleeve, provided with a corresponding number of external radial wings, which come between the wings formed on the hub. On the outer face of the sleeve are projecting teeth for a purpose to be described.

Outside the sleeve there is a dished plate or cap which is fixed to the end of the driving shaft and is compelled to rotate therewith. The inner face of this plate has recesses corresponding with and fitting upon the teeth on the above-described sleeve and thus communicating motion thereto. Resting in the spaces between the two sets of wings are rubber blocks and motion is transmitted through these to the hub and wheel. Owing to the elastic nature of these blocks shocks are either entirely absorbed by them or are greatly diminished.



THE EVOLUTION OF THE AUTOMOBILE

The observer with no especial interest in the automobile, and not a partisan of one or another variety, genus, or species—whichever is the proper term—who simply looks on and watches the results reached by richer people who are spending much money in the encouragement of invention and experiment connected with motor vehicles, has probably noticed that the horseless carriage is gradually assuming a form peculiarly and distinctly its own, says a writer in the New York Times. This is as it should be. The earlier forms were made in imitation of types of carriages intended to be drawn by horses, and which in the public mind were associated with horses. The addition of the mechanism of auto propulsion, impossible of concealment, made them look deformed and deprived them of every element of grace and beauty in the arragement of their running gear. They were simply misshapen and ugly carriages, and no amount of decoration in the superstructure made them anything else or distracted attention from structural features suggestive of elephantiasis in their lower members.

The reaction from this tendency to follow established patterns was first expressed in a sacrifice of beauty to utility so complete that the result was indescribably ugly. They looked more like freak locomotives than like road vehicles for pleasure purposes. It was, however, a movement in the right direction, and may be compared to the Eastlake movement, which aimed to re-establish honesty in construction and legitimacy in the structural employment of materials. It did not take long, however, for the thoughtful to discover that Eastlake's protest against the use of wood in any form other than one in which the grain remained straight was fallacious. The bent-wood furniture was just as honest as the Chippendale, and much better adapted to modern requirements. It represented the best possible constructive use of the material and gave the maximum of strength without clumsiness or excess of weight. Similarly, in the motor vehicle, the fact is being learned that the highest attainable standard of utility is not inconsistent with shapeliness and the grace which always belongs to appropriateness. It is primarily a motor mechanism. Any attempt to conceal or subordinate this fact spoils the design. It must also have as a superstructure a comfortable and capacious body for the accommodation of the passengers. In this respect it may with advantage resemble the horse-drawn vehicle, since the requirements of comfort are substantially the same in one class of vehicles as in another. On these lines we are gradually approaching a standard of automobile design which will be satisfactory. If we have not reached it yet we have at least made gratifying progress toward its attainment.

The employment of motor vehicles for business purposes in place of trucks drawn by horses will come about in time for economic reasons. Horses and wagons take up altogether too much room. What a locomotive truck can do in 10 feet a truck drawn by horses requires 20 feet to do. Dispensing with horses will consequently double the capacity of our present congested streets. This is of first importance. Another advantage will be found in the greater ease and lessened cost of keeping our streets clean and well paved. The efficiency of the horse consists in his willingness at times to exert himself to do what should not be asked of him by a considerate driver, and this he accomplishes only by digging his toe calks into the roadway and pulling to the maximum of his strength. Such efforts are destructive of street pavements and entail an annual cost for repairs which is not in any way compensated to the community. The evolution of the business vehicle has already given us perfectly satisfactory types, and their rapid multiplication in large cities is indicative of progress. In this case the problem is much simpler than in the case of the pleasure carriage, since utility is the beginning and end of the designer's effort, and where this limitation is strictly observed beauty and use are commonly found to go hand in hand. The ornaments of the business vehicle are incidents of a decorated construction; those of the pleasure vehicle are yet mostly in the classification of constructed decoration.

NEW INCORPORATIONS AND ENTERPRISES

The Woods company has just sold to John E. Morand, president of the Indianapolis Transfer Co. and the Frank Bird Transfer Co., ten electric cabs for use in the Hoosier capital. It is stipulated that the outfit shall be delivered inside of 30 days. Porter batteries will be used. The charging station will be at the Frank Bird stables, at 319 East New York street. The cabs will be stationed at the Union station, Denison, English and Grand hotels and at the stables of the Indianapolis Transfer Co., in North Delaware street, and the Bird stable. It is expected that the cabs' batteries, when charged, will run about 50 miles.

The people of Indianapolis have been clamoring for the automobile cab service for such a long time that Mr. Morand is satisfied that the new vehicles will be well patronized. If they are, others will be substituted from time to time for the horse cabs now controlled by the company.

The Indianapolis and Bird companies consolidated about a year ago for the purpose of using automobiles. At that time a certified check of $5,000 was deposited with another maker for a contract that was never carried out. That check has been withdrawn.

Auto-Car Line in St. Louis

One of the late incorporations under the laws of Illinois is the Interstate Rapid Transit Co., capital $200,000. Under this name the concern will operate a line of automobiles between St. Louis, East St. Louis and Belleville in competition with the street cars, running over the Eads bridge. Charles W. Thomas, the company's attorney, makes the following statement:

"The investment is purely a business one with us, and we believe it will prove profitable, of course. We have ordered six automobiles. Three of them have been completed and are on the way to St. Louis from New York. The other three will follow soon. The first three are arranged to accommodate eight persons inside and three outside and the latter three will carry ten persons inside and three outside. We are now working on plans for vehicles which will carry 20 persons. The power will be electric storage batteries."

The line will be in operation by March 1. All of the people interested are St. Louisans.

Lansing, Mich., is to have a factory, established by the Prouty Motor Co. of Chicago for the manufacture of gasoline motors and automobiles.

The Greencastle Automobile Co. of Greencastle, Ind., capital $25,000, has been incorporated. The directors are Henry S. Renick, Quinton Broadstreet, Correll M. Bell, Charles Broadstreet, George E. Blake, Alfred Hirt and S. A. Hirt.

The Ford machine has made a hit with the people of Detroit. The Detroit Automobile Co. is to be reorganized as a manufacturing concern, to make Ford's vehicles. One of the people connected with the enterprise believes the company will be able to make a vehicle capable of making a mile in 30 seconds.

The Ayers Gasoline & Automobile Co. has filed articles of incorporation with the secretary of state at Lansing, Mich., with the following directors: W. F. Ayers, George W. Morley, H. Pistorius, H. Goeschel, C. B. Allen, E. G. Satterlee and A. M. Lemke. The officers are: President, W. F. Ayers; vice president, G. W. Morley; secretary, H. Pistorius; treasurer, H. Goeschel. The company will enlarge its factory and install new machinery.

Articles of incorporation have been filed of the Woodbury Mobile Transit Corporation of Woodbury, Conn. The objects of the corporation are "to carry and convey persons for hire, in vehicles propelled by horses, electricity, steam, gasoline or other motive power. The capital stock is $5,000 and the incorporators are Arthur D. Warner, H. D. Curtiss, Edward S. Boyd, Floyd F. Hitchcock and W. L. Lindsley. The company intends to establish a route between Hotchkissville to Woodbury, Southbury, and the Pomperaug Valley station on the Highland division of the Consolidated road, the motive power to be steam.

OIL ON THE ROADS OF CALIFORNIA

For a year or more the use of oil on the roads has been practiced in some parts of California. The first experiments were made not less than 3 years ago, but on a small scale. They have since been continued to such an extent as to furnish reliable information as to the result. Since the introduction of the automobile the need of some method of laying the dust has been more severely felt than ever, but whether the effect of the oil on rubber tires will be such as to make enemies for the new system among automobilists and cyclists, has not yet been fully determined. The number of communities adopting the innovation is constantly enlarging. The system meets with favor possessing real merit, inasmuch as by its use the condition of the roads is much improved and the comfort of the traveler greatly increased.

EVERYTHING IN ITS FAVOR.

The city and county of Sacramento have, after conclusive experiments, adopted the plan, and the results have proved most satisfactory. The oil was applied hot and cold, the first giving the best results. Heated to a temperature of 180 deg. in a boiler adapted for the purpose, the oil was pumped into the sprinkler and then sprayed over the roads. The tanks, boilers, pumps and injector cost about $1,000. The experiment proved the decided economy over the water system, beside lessening the cost of the maintenance of the roads, giving a hard, smooth surface and allowing increased loads with a decreased strain upon horses. Sprinkled with oil the roads are practically dustless. It is asserted that the injury to rubber tires was found to be practically nothing. The first application requires one-third more oil than subsequent ones; two, in some cases one, applications a year is all that is ever required.

A SAVING OF 45 PER CENT.

The city of Catton, in Southern California, computes that the expense of sprinkling its streets with oil has reduced the expense from $1,200 a year to $745, a saving of 45 per cent.

In the County of Kern 100 barrels of oil to the mile on roadways 12 feet wide sufficed for the first application, and 60 barrels for the second, 6 months later, secured permanently good results with generally improved condition of the highways. A contract was let to one oil company by which a road was first harrowed superficially and heated oil applied, with a result that confirmed the success of the process. The entire cost was covered by the payment of $1 a barrel for the oil. In Los Angeles, a large producer of mineral oil, the custom is fixed and all its delightful drives are sprayed with oil. The cleanliness and perfection of condition of the streets of that city is remarked by eastern tourists as a most enticing feature of the place.

USED IN GOLDEN GATE PARK.

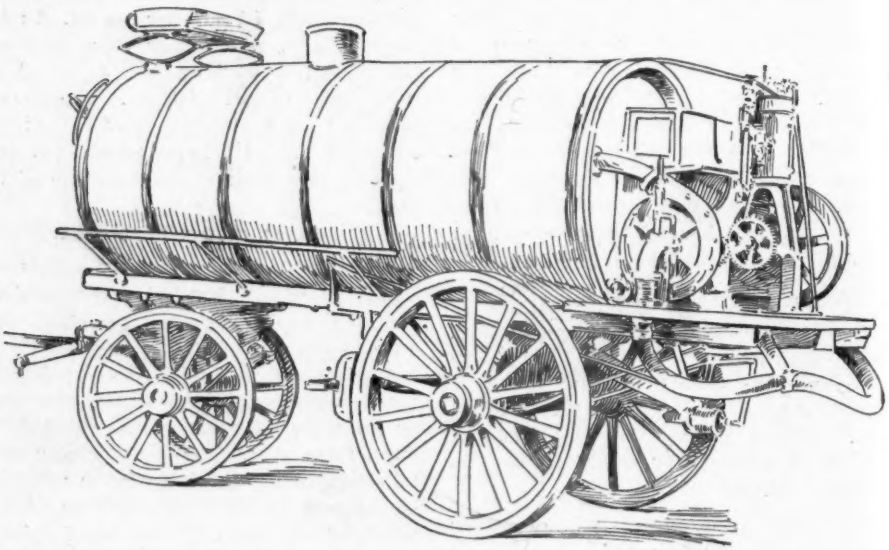
In San Francisco, where the streets are mostly paved with basalt blocks or asphalt, sprinkling with oil has not been tried as a civic measure, but the commissioners of Golden Gate Park, in defiance of public opposition, concluded to make an experiment on an extensive scale on the main driveway of the park. This thoroughfare is 4½ miles long, and extends from one extremity of the park to the other, with an average width of 35 feet. Thousands of vehicles and a multitude of individuals pass over it every week. The roadway is scientifically constructed, and is as perfect an example of a dirt road as it is possible to make. The first application consumed 6,000 barrels of oil, costing about $1 a barrel, and the surface was thoroughly saturated. In soft spots the process was repeated. For a time the odor was objectionable, but this soon disappeared through the action of wind and sun.

DUSTY FOLIAGE NOW VERDANT.

There was no damage to clothing, as anticipated, and for a time the driveway was avoided by persons with wheels, but whatever inconvenience was temporarily caused by its means soon vanished as the marked improvement in the drives became perceptible. Time has demonstrated the efficiency of the application of oil to the

roads. The surface is impacted and firm, giving the same character to the drive as if covered by asphalt, and at the same time the visual appearance of the park has greatly improved. For 8 months of the year, during which there is no rain, the clouds of dust arising from the dirt roads settled upon the foliage turning it into a hue of dirty red, marring one of the exceptional beauties of the park. Since the application of oil the dust no longer flies and the verdancy of the trees and plants is no longer obscured. The economy of oil over water for sprinkling is demonstrated. The commissioners estimate a saving of $500 a month on the one driveway alone, besides saving 70,000 gallons of water in each day. Two applications a year is all that is requisite. The cost of oil is now 87½ cents a barrel.

The sprinkler commonly used differs in no respect from that in which water was distributed, excepting in respect to a regulator being attached which produces a fine spray of oil. An engine is sometimes attached to the tank where the oil is not supplied by gravity or when the tank is filled from the heating boiler.



AMERICAN EXPORTATION OF BICYCLES

Export trade papers have recently given a great deal of space to discussion of the bicycle export trade. Some say that it is all over with the demand for American machines in foreign countries; others go even so far as to state that bicycle enthusiasts are rapidly decreasing in other countries as well as at home and by "at home" they mean and mention the large cities, such as New York, Chicago, Boston and Philadelphia. But bicycle makers should not be and probably will not be discouraged by such rumors. They are erroneous and often written by people who know nothing about the cycle trade in foreign countries and have no means of ascertaining the exact situation. Records, or statistics, speak more truly than anything else and if the recent government reports are consulted and the tables of exports, published every week in New York and other cities, are looked over, it will be seen that, while we are not making a great increase, we are not losing and in some instances are gaining.

It should be remembered that in those countries to which we exported large quantities of bicycles in former years, the bicycle industry has developed and the output is greater than the home demand, while the prices are as low as, if not lower than, our own. Taking, for instance, Germany, Belgium and France, no one will deny that bicycles can be bought just as cheaply from the makers in those countries. True, they are not fully up to our standard, that is, equal in finish and general appearance to our medium priced machines; but in those countries the middle class does not care a great deal for elegance, fine looks, or fine equipment. All that is wanted is a very strong bicycle. Whether it weighs 25 or 40 pounds or whether it is the latest model or the oldest, makes little difference. All that the people want is something strong enough that they know their lives are not in danger.

As has often been told, the real cause of our loss of trade in most European countries was that we sent over too large quantities of what is generally termed "trash." It is only during the last two years that the demand for American machines has again increased and it is now in a fair way to better itself. It is even in such progressive state that the British trade papers are again uneasy about it. In a recent number of the Cyclist that paper says:

"As regards the question of American competition in New Zealand and Australia, the Yankee traders are first and foremost advertisers, booming their wares everywhere in an attractive manner. They are, moreover, more attentive to details than the home makers and pay more attention to the seemingly unimportant points. Quite recently an Australian agent wrote us as follows: 'The push and go of the Americans is in a marked contrast superior to that of the English. Notwithstanding that my interest is with the English machines, I am bound to say that the short-sighted policy of the English manufacturers in execution of orders, attention to detail, building machines without re-inforcements and not helping agents to uphold their guarantee of defective parts, etc., is in glaring contrast with the American trade.'"

That there is a great demand for our machines in New Zealand and Australia may easily be observed from the fact that a number of our makers have established regular agencies, supplied in such way that there is almost a small factory in some of the large cities in Australasia. Even the mail order houses are advertising quite extensively in the papers of those two countries and it appears that it more than pays them. One of our consuls in New Zealand recently wrote an interesting letter to a business man in this city. He said among other things:

"When shipping bicycles to New Zealand it is necessary to take out two separate invoices, one for the cycle and one for the tires. It is also of great importance to see that the correct value is put on each separate invoice. Bicycles are selling very well in New Zealand, but they are used more in the one particular part of New Zealand, viz: Christchurch in the south

island, where the country is not so mountainous as it is in the north island. I understand, however, that the imports from America in this particular line of goods have fallen off considerably in the past two years because of the fact that the business was greatly overdone at one time. There are very few bicycles imported ready made, that is to say put up ready for use. They are imported in the four chief cities, Auckland and Wellington in the north island, Christchurch and Dunedin in the south island, in raw state. The material for making, generally speaking, is neither painted nor polished when it arrives. By pursuing this course they are landed free of duty. These parts are then sent to the factory and put together. In this way they can be sold cheaper than when imported with the parts put together ready for use. Regarding tires I would say that American and English are mostly used. My idea is that the bicycle trade is greatly overdone here; I know it is in this city. This consulate has been flooded with letters from dealers in bicycles, each saying that his particular wheel is better than any other."

Similar letters were received from consuls in other Australasian cities and all point to the fact that while there is quite a demand for our machines attention should be paid to sending the very best, as there are many attempts to flood the market with cheap machines.

Here is a copy of the opinion of one of the large forwarding agents in Chicago, through whose hands most of the bicycles exported from this city pass:

"The outlook abroad for marketing American bicycles is very encouraging. The season closed with fewer of our bicycles in the hands of foreign sales agents than has been the case at the close of any season for the last several years. The tendency to consign bicycles to foreign parts is decreasing and practically all shipments at the present are under accomplished sales. Trade to Australia and New Zealand shows a marked improvement on account of the increased and economical facilities from the Atlantic seaboard. The forwarding companies have taken advantage of the frequent direct steamers from New York to Australian and New Zealand ports and have accepted rates on bicycles which are very reasonable as compared with the cost via the Pacific coast. The increasing prestige of the United States has also been a factor in helping business, as more orders are coming direct to the United States from these countries than has been the case in past years. Many American bicycles have reached these countries through English jobbers, but this trade is now coming direct from America. Trade to the West Indies has also been very good and the increasing exports in all lines have helped to make the shipping services to these points for small lots more efficient and the rates more reasonable."

SET THE FASHION TO THE WORLD

The death of James K. Starley, the man whose Rover bicycle "set the fashion for the world," is of course commented on at great length by the English press. His record and that of his famous machines, was such that it was almost equally well known on both sides of the Atlantic. Mr. Starley was one of the most important links in the chain of cycle industry. He was only forty-seven at the time of his death. At the age of eighteen he was experimenting upon a steam engine, the drawings of which he sent to his uncle, James Starley, who was then engaged as a member of the firm of Smith & Starley in the manufacture of sewing machines and bicycles at Coventry. His uncle offered him a post in the works which he accepted. It was the Ariel bicycle that the firm produced but this department of the business was shortly afterward sold to Messrs. Haynes & Jeffries, the first purely cycle manufacturing firm in Coventry, and young Starley was appointed works manager, a post which he held till 1878, when he commenced business on his own account. His first bicycle was known as the Meteor, a name which is still retained for one of the machines turned out by the Rover company, the successor of his early business, and the firm of which he was at the time of his death managing director. Mr. Starley devoted his ingenuity to the production of a two wheeled machine embodying lightness and ease of propulsion. Others were working in the same direction, but Mr. Starley, while not introducing any startling novelty that was unknown previously, produced the Rover which combined the virtues of the rest without possessing their vices. The introduction of this pattern, which he first made with bridle steering, practically crowned his work in the perfection of the modern bicycle, and with comparatively little alteration, it is the type of machine now in general use. Although in the eyes of experts and connoisseurs of the day the machine lacked the grace and dignity of the high bicycle, and although it was confidently asserted that the chain transmission of power would never hold its own against a direct drive, the Rover when fitted with direct steering asserted its superiority in all the contests in which it took part, particularly in the great hundred miles road race of September, 1885. Prejudice gradually gave way before utility, and the daring innovation was made in contravention of all traditions of propriety of mounting a lady upon the new machine. Mrs. Grundy was shocked, but although the lady cyclist pioneers had to meet a storm of abuse, they conquered eventually, and today they are as numerous as, if they do not outnumber, those of the sterner sex. Since that time Mr. Starley was practically enjoying the fruits of his early resourcefulness and ingenuity. He built up a business, which is a model of what such concerns should be. It was really the possibilities opened up by the introduction of the Rover that led to the cycle boom. Yet he resisted the temptation to sell his business to the speculative company promoter for a sum greatly in excess of its real value—a temptation to which many of the other cycle firms at that time succumbed. The facts are that in the height of the boom he sold his business for conversion into a limited liabilty concern for £150,000, whereas he might have received £175,000 from another source, his reason being, of course, that he declined to have his name associated with a company that was over capitalized. As a result of his honorable conduct in this transaction, and of his own large personal financial interest in the business throughout, the Rover company is one of the cycle firms that have always paid a dividend since the boom. His whole connection with the trade entitled him to rank as one of its foremost representatives. His contributions to the literature of the trade are by no means insignificant, one of the most important being a paper which he read before the Society of Arts two years ago entitled "The Evolution of the Cycle," for which he was awarded the society's gold medal. He was highly esteemed by all who knew him.

He was a man of many parts and having perfected his bicycle he turned his activities into other useful channels, chiefly religious

and philanthropic though he was not without sporting instincts. The wealth that came to him he dispensed liberally among deserving charitable, moral and religious institutions. He served upon several local

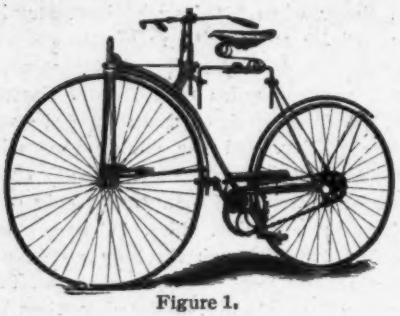


Figure 1.

public bodies and his name was once prominently mentioned in connection with the representation of the city in parliament.

We give an illustration reproduced from the Cyclist, of the Rover bicycle which "set the fashion to the world." It was designed by Mr. Starley in the summer of 1885 and in the autumn of that year all previous records for 100 miles were completely upset by G. Smith of the Merry Rovers Club, who, mounted on a Rover, covered the distance in 7:5:16. The first 50 miles were covered by S. Golder, later well known in America, in the then unprecedented time of 3:5:34. The front and back forks were made from crescent steel, that is to say they were not hollow but were one thickness only in section, thus). The bottom forks, or chain stays, were tubular and the crank axle ran in two separate bearings.

Figure 2.

The top tube developed later, but its place was taken by a double L rod, as shown, which was adjustable from the back and front and served the dual mission of top stay and saddle pillar. Instead of socket steering, as now used, short center steering was adopted, a method which was then generally employed on high bicycles. The front wheel was 36 inches and the back 30 inches. It is also interesting to note that the roller chain was 1¼-inch pitch and ½ inch wide. The spring was the Harrington cradle, the most comfortable spring device ever applied to a cycle saddle. Figure 1 shows the original Rover and Fig. 2 its immediate predecessor. The latter was practically the same except that the steering was not direct. It was exhibited at the Stanley show, of February, 1885, which was held in a tent on the Thames embankment.

Further Reports From Cycle Makers

William Hengerer Co.: We are going to remain in the bicycle business as manufacturers, and the prospects for business the coming year are very satisfactory indeed to us. We have since July 1 been making up large quantities of bicycles for the large jobbers and have been successful along these lines. We have, up to the present time, orders in our factory for more bicycles than we have ever made in any previous year. This is not taking into consideration our regular agency business.

We have just started out our traveling force and the results of their efforts are gratifying. Our various models for the coming year will be as follows:

Model 43, ladies' and gentlemen's, $25; Buffalo King and Queen, ladies' and gentlemen's, $35; Buffalo King Racer, $40; Hygienic cushion frames, ladies' and gentlemen's, $50; chainless cushion frames, coaster and brake, $75.

We have largely increased our facilities over previous years and are now running our factory to its fullest capacity.

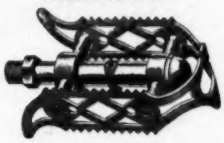
Fowler Cycle & Carriage Works: Our intentions as to the bicycle business are that we are going ahead with it and shall have a line for next season consisting of five models, including juvenile. We find that our agents, who were put out a great deal by our disastrous fire, are with us again and assure us of their co-operation and support, and from the number of inquiries we receive each day we anticipate that we shall have a profitable and successful season. The former standard of Fowler quality will be

TOOL STEEL BALLS

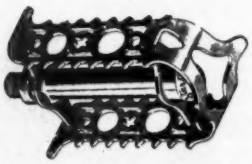
We make over 500,000 balls every day. Our plant is operated day and night to keep up with orders. All the large automobile makers buy from us. Our regular stock consists of balls in sizes from 1-16 to 4 in. in diameter.

THE AUTOMOBILE AND CYCLE PARTS CO.
CLEVELAND BALL AND PEDAL FACTORY
CLEVELAND, OHIO.

RECORD



STAR



BRIDGEPORT

1902
MODEL

PEDALS

NOW READY
Send for Quotations

The Bridgeport Gun Implement Co.,
313-317 BROADWAY, ... NEW YORK

maintained to the highest degree in all of our models and they will embody every new and up-to-date feature.

Exports of Bicycles

Washington, D. C., Nov. 20.—The following are the exports of bicycles and parts from the port of New York for the week just ended: Antwerp, bicycle material, $1,440; Argentine Republic, material, $363; British East Indies, material, $2,234; British Possessions in Africa, $204; Bremen, material and bicycles, $290; Brazil, velocipedes, $108, bicycles and material, $421; British Australia, bicycles and material, $1,335; British West Indies, bicycles and materials, $869, sporting goods, $56; Christiania, material, $50; Cuba, bicycles, $238, velocipedes, $53; Central America, bicycles, $65; Copenhagen, material, $173; Chili, tricycle, $10; Dutch Guiana, bicycles and parts, $748; Gothenburg, bicycles and material, $35; Havre, bicycles, $6,087; bicycles and parts, $3,367; Hamburg, bicycles, $3330; material, $350; London, bicycles, $200; bicycles and material, $1,176; Liverpool, bicycles, $737; bicycles and materials, $125; velocipede, $55; Mexico, velocipede, $40; Rotterdam, material, $190; bicycles, $249; Southampton, materials, $76; Stockholm, material, $484; Vienna, material, $125.

J. C. Campbell, the veteran Dayton traveler, has just completed a visit among the trade of the larger southern cities, and reports the outlook for 1902 business among Dayton agents in that section favorable. More confidence is felt in the business by those who remain, and a better demand is experienced for high grade goods of the quality that Mr. Campbell represents.

The rumor that the American Bicycle Co. will forsake Syracuse as a manufacturing center seems to be verified by the latest report from that city to the effect that it has not renewed the lease of the building it has occupied there and which is owned by the Syracuse Chilled Plow Co. The present lease expires July 1.

Owing to the many new lines taken on by the New Departure Bell Co. it has been decided to change the name to the New Departure Mfg. Co. This company has increased its plant and is extremely busy in what is usually a dull season. This change of name takes effect Dec. 1.

Brown & Beck, 1800 Champa street, Denver, write that they are in the market for bicycle sundries of all kinds, having decided to embark in wholesaling in that line. They send a list which contains practically all the standard articles.

On November 9 Didier-Nauts, formerly an amateur, covered one kilometer, or 1,093 yards, standing start, paced, in 1:04 1-5, breaking Michael's record of 1:07 3-5.

Waverley

Electric Vehicles

Vary in construction in several ways from all other makes of electric vehicles. They are lighter and of longer mileage range. In operation, simple, noiseless, odorless. In appearance, clean, handsome and comfortable looking. The exclusive possession of all these qualities place the Waverley in a class by itself.

Model No. 22, Road Wagon with Top.

DESCRIPTION:

WEIGHT—1,050 lbs.

BODY—Piano box pattern; length, 5 feet 10 inches width, 2 feet 3 inches; height from ground 25 inches

UPHOLSTERING—Handsomely finished in dark green leather.

TOP—Full leather.

WHEELS—30 inches diameter, wire spokes; 2½-inch pneumatic tires.

MOTOR—The motor is of a new and improved design of a normal capacity of 2 H. P. capable of an over load of 2 H. P. additional. Speed from 8 to 17 miles per hour.

GEARING—The gearing is of the "herringbone" type protected in dust-proof cases and runs in oil.

INSTRUMENTS—Each vehicle is equipped with a combination volt and ammeter.

BATTERY—The Sperry battery is used. Weight 360 pounds.

RHEOSTAT—An extra charge of $25.00 will be made for rheostat for charging battery.

PRICE **$925**

American Bicycle Company,

WAVERLEY AUTOMOBILE DEPT.

Indianapolis, Ind.

NEW YORK BRANCH, 91 FIFTH AVENUE.

That the MOTOR AGE's second annual Directory, which is to form a part of the Christmas issue, will fill a want of the trade is shown by the number of communications concerning it received during the week. The first announcement concerning it was made a week ago and already more than 250 concerns have supplied the information asked for.

Makers who have not already done so are invited to forward details of all the goods they manufacture. A suitable form will be provided for those who ask for it, containing a list of the articles which it is intended to classify.

There will be no extra charge to subscribers or to those whose advertisements appear in the issue. To others the charge for the directory number will be $1.00.

MOTOR AGE.

Monon Bldg. CHICAGO

NOMENCLATURE OF THE GASOLINE MOTOR

The American Manufacturer finds many conflicting expressions in gas engine nomenclature and tells of them in a way which will be instructive to many readers. Perspicuity, it says, is defined as "that quality of writing or language which readily presents to the mind of another the precise ideas of the author." Again, we are told that "perspicuity is the first excellence of writing or speaking." In reading various books, catalogues and other literary productions on the subject of gas and gasoline engines, however, one is impressed by the lack of perspicuity or exactness in the application of various terms and also by the lack of uniformity in spelling of the same words.

For instance, the machine itself is called either an engine or a motor. The adjective applied to these names is sometimes "hydrocarbon," sometimes "internal combustion," and at other times "vapor," as well as the ordinary and more specific epithets of "gas," "gasoline," "kerosene" or "crude oil," etc. Among all of the various engines built, there are practically only two general types, what are commonly known as the "four-cycle," and the "two-cycle." In gas engine literature I have found these two types variously described, in addition to the names already given, as follows: "The Otto cycle," "the Beau de Rochas cycle," the "double" or "single" cycles, and some people even call them the "two-stroke" and "four-stroke" cycles. Ordinarily we speak of a horizontal or a vertical engine, but one manufacturer, according to his circulars, builds a "vertical motor." One professor of mechanical engineering objects to the use of the term "hit-and-miss" and states it should be hit or miss. Among the means adopted for transmitting motion from the crankshaft to the valves, etc., are the following: "Lay shafts," "side shafts," "lateral shafts," "cam-shafts," and "two-to-one shafts."

The device which seems to cause the greatest confusion, however, is that by which the liquid fuel is transformed into vapor or transferred directly to the engine. Not only are there different terms used for the same thing, but the same term is used for different things, and the same word is sometimes variously spelled. For instance, a device called by some manufacturers a "carbureter" is called by others a "carburetor" (the English spelling), and by others a "carburetter." For this last spelling there seems to be no justification, however. This same device is also called a "gasifier" by another well-known manufacturer. There are other devices called "vaporizers," which may be the same as some of these carbureters, or may be more like what is ordinarily thought of as an "injector." Still other names are the "atomizer," the "sprayer," also the "evaporator cylinder." These are names applied to different devices for preparing the liquid fuel outside of the engine cylinder, or for injecting it from some sort of a feed box or other contrivance into the cylinder in the form of a spray. As if there were not already enough varieties in these devices for preparing the liquid fuel, and in the names of these devices we are encountered by references to "gasoline feeds," "feed cups," or "boxes," as well as "gasoline cups" and, finally, to the "mixing chambers." This various list of means for supplying fuel to the engine seems to be not only a veritable chaos of devices, but also to names, and it is very hard for one to distinguish the dividing lines between the various types of feeds.

Two of the commonest words in connection with these engines are spelled in two different ways. The liquid fuel is called by some "gasoline" and by others "gasolene." The igniting apparatus is sometimes referred to as an "igniter," at other times by "ignitor." I have found catalogues with both spelling of these two words.

But what difference does it make anyway? "A rose by any other name would be as sweet." You perhaps would know the meaning of this diversified list of names but how about your prospective customer? I quote from a letter from such a customer: "We find the catalogues sent out by the various gas engine manufacturers contain many unimportant statements, but

as a general rule omit that which will give the purchasers some idea of their engines." How is a man, who perhaps has never seen a gasoline engine, to distinguish the different merits of engines which are described by this motley of undefined and frequently misapplied names? He simply can not do it.

One of the great aids to business in this age is the standardization of materials. For instance, what would we do if our screws were not standardized, and if every screw manufacturer used his own standard? Even now we have a few standard shapes and specifications of threads which often create considerable confusion. Standardization has resulted in decreased cost of production as well as increased facility for use. But standardization or uniformity of nomenclature and of spelling is equally as important.

I have not attempted to correct all the errors to which I have called attention, but have aimed more particularly only to call attention to these errors and diversities, some of which are not incorrect, but merely different ways, all of which may be correct. To correct all these errors would require the combined efforts of the most learned professors of the English language, as well as those of that branch of engineering relating to the type of engine referred to.

Prefers Storage Batteries

Sacred Heart, Minn., Nov. 21.—To the Editor.—I have for the last 6 months been experimenting with a Crest duplex double-cylindered motor, and having considerable trouble with it, but it all arose from the use of too weak batteries. I have been using dry batteries, but they do not last, especially on so high speed a motor as mine. I now have two sets of storage batteries, which run my machine from 110 to 120 miles. I have had no bother since I obtained them. They cost me $7 a set. I would have put on a small dynamo, but it is not so easily connected on account of motor having the fly-wheels enclosed. Another thing is that the wires running to the sparking plug ought to be of very heavily insulated flexible wire. I have tried smaller wire, but if it lies against the motor frame it loses sparks and does not give enough where needed.—Yours, etc., A. A. Gerde.

Dietz Automobile Lamp

They all wanted Lamps for use—Lamps which required little care and could be depended on under all circumstances.

—

They were experienced and knew that all these qualities could be best found in the

—DIETZ—
AUTOMOBILE LAMP
For Kerosene.

Hudson. N.Y.
Sept 16, 1901

R E Dietz Co
60 Laight St. N.Y
Gentlemen.—
Please send me your catalogue I saw that every machine except motorbicycles in the New York—Buffalo run of the Automobile Club of Am. had the Dietz Lamps on them.
Yours respectfully.
Donald M. Powers.

R. E. DIETZ COMPANY,

37 Laight St., N. Y. Established 1840.

THE COST OF OPERATING STAGE LINES

BY W. F. D. CRANE, M. E., ORANGE, N. J.

For some time past I have been seeking information as to the actual cost of operating an automobile stage line, the figures for costs for power and repairs, etc., to be those obtained in actual public service. From the fact that my inquiries have thus far been answered by manufacturers who refer to a more or less beautiful vehicle, usually on paper, with much mention of capabilities and none of performance, I have been forced to believe that there is, as yet, no successful auto-stage line in operation in the United States. If I am wrong in this belief I should be glad to be corrected and learn the particulars of the operating conditions.

I am assured that at the present moment buses are being built in various parts of the country; also that buses have been operated here, but facts relating to the performances of the latter and the reasons for their removal from service have not been made clear to me. It is stated that the auto-buses in England have proven successful under the conditions there, but it would be highly desirable to have facts presented which would apply to our condition and prices here.

It is rather amusing at this state of the art, to note the willingness with which the manufacturer suggests that the prospective purchaser buy his untried machinery and take all risks thereafter. There are many prospective purchasers, however, who do not care to risk the investment of their cash in possibly worthless machinery and to undertake an enterprise in which, though the first costs be fixed quantities, the subsequent important costs of operation and maintenance and the income received through fares are so largely represented by the unknown quantities x and y. My experience leads me to venture the statement that the maker who first places himself in a position to answer, intelligibly, questions as to what it will cost to run his apparatus after he has furnished it, will receive the serious attention of a large and much interested public and reap corresponding rewards for his enterprise. Estimated costs obtained in spasmodic experiments of a month or so will not answer. The auto-stage business must eventually meet the requirements and be based upon the exactness of street car practice.

As indicating a portion of the day's intelligence on the subject, I copy entire a letter received from a correspondent who shall be nameless:

"I glean from the MOTOR AGE of the 14th inst. that you are deeply interested in ascertaining about the cost of operating buses used in the public service and that you are of the opinion that the steam vehicles, so far as made, are too frail for use. Now, dear sir, this letter is to disabuse you of so erroneous an opinion from the fact that I build vehicles for heavy work, such as the inclosed circular represents, that are strong enough to carry one hundred passengers all over the country, with engine power enough to haul any amount. The engine in the circular is 20 horsepower and it hauled the vehicle that the five plows are attached to, that the vehicle itself weighed five (5) tons and hauled the five plows and cut 5 furrows all at once, so this is proof enough to convince that you can get a bus to haul any amount and as fast a speed as you desire, or as the law allows. I shall be glad to hear from you on the matter."

The gentleman forwards with his letter an illustration of a traction engine, with plows attached, the design reminding one of Stevenson's early attempts at the locomotive.

The electric stages on Fifth avenue and the cross town steam wagonettes in lower New York city and other places have demonstrated the extraordinary amount of wear and tear to which vehicles of this class must be subjected in public service. Probably no piece of mechanism will ever be more abused than the automobile public bus. Manufacturers have failed to appreciate the fact and the serious mechanical problem still confronts them. It is not likely, therefore, that every maker or inventor who imagines he has ideas, a good

motor or an attractive design will produce a practical machine; and the prospective purchaser who is bent on getting his money's worth must therefore remain suspicious and a sceptic until sufficient time and trials have demonstrated the ability of a vehicle to reasonably endure the severe conditions obtaining in public service and at what cost, so that its feasibility as a money maker in various localities may be determined.

An Explanation From Thomas

Buffalo, Nov. 25.—To the Editor: As there were so many comments made upon the fact that our 1902 models were not exhibited at the late automobile show, we feel that some public explanation is due. From a manufacturer's point of view we do not believe in fall automobile shows, and from the "growls growled" by manufacturing exhibitors, many of them are of the same opinion. The principal objection arises from the fact that a large number of visitors are solely actuated by a desire to see the latest improvements and to obtain such information as will enable them to produce in time for the spring trade a vehicle combining the most practical and desirable improvements included in all styles exhibited.

For several months this company has had a corps of skilled experts devising, experimenting and testing new improvements in motors and a new design of motor bicycle for the use of our manufacturing customers. Having ready for next season's trade new and original designs, that far surpass in beauty, efficiency and comfort anything that has yet been shown, we desire to get the benefit for ourselves and our agents and hence reserve our exhibit until it is too late for competitors to copy. In due time cuts and description of our new design will be furnished for publication.

We trust that our friends and the expecting public will appreciate the conditions that justify our action which, we believe, will be followed by many other manufacturers in coming seasons.—Yours, etc., E. R. Thomas Motor Co.

The Long Beach Automobile Co. is being organized at Ilwaco, Wash. The object of the company is to have a number of automobiles on the Washington beach resort next summer.

Cycle Makers Tried for

A

QUARTER

of a

CENTURY

Before they were able to make a machine as light as those of to-day and guarantee them as comfortable and reliable. The

Cushion Frame

was the missing link between comparative and absolute comfort. It not only saves the rider but it saves the machine. It checked the downward course of prices, made it possible for the dealer to ask a good price and at the same time

Satisfy His Customers

A satisfied customer is the best recommendation. The Hygenic Cushion Frame satisfies everybody.

HYGIENIC WHEEL CO.

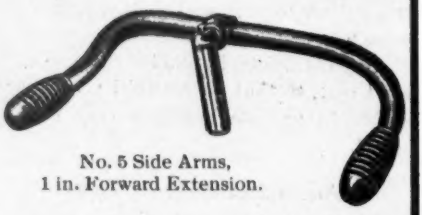
St. Paul Building,

NEW YORK

1902 Kelly Adjustable Handle Bars

STANDARD BARS OF THE WORLD

No. 3 Arms, Regular Stem.



No. 5 Side Arms,
1 in. Forward Extension.

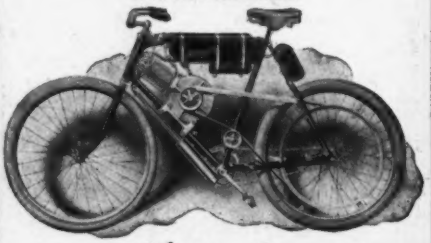
No. 4 Racing Arms,
2½ in Forward Extension

It will pay all manufacturers these times when competition is hot, to see that their wheels are equipped with just the attachments demanded by the rider. Every rider knows the merits of KELLY BARS, as they have been for the past six years the most popular and foremost sundry in the cycle trade.

The Kelly Handle Bar Co. CLEVELAND, O. U. S. A.

WE ARE NOW READY

WITH OUR 1902 MODEL



Mitchell Motorcycle

Improvements:

The Driving Pulley is now made "V" shape to accommodate round belts. Valve Lifter—A lever is vow provided convenient to the right hand, by which the valve may be opened at any time. Speed Lever is also located convenient to the right hand. Ball Bearing Idler reduces friction. Twisted Rawhide Belt, guaranteed non-breakable and non-stretchable.

WISCONSIN WHEEL WORKS,

Dept. M Racine Junction, - - Wisconsin

Delays, discomforts, annoyances eliminated. Long or short journeys on business or pleasure anticipated without anxiety and accomplished without mishap when equipped with

The Long Distance Tire

The most reliable tire on the market. No other gives such satisfying service. Constructed on a simple sensible principle. The clock face shows a cross section of the tire. Have your dealer or manufacturer of carriage or automobile put it on your vehicle, or write to us for it or about it.

NEW YORK BELTING & PACKING CO., Ltd.,

NEW YORK,	91 Park Place	CHICAGO	150 Lake St.
BOSTON,	94 Summer St.	INDIANAPOLIS,	229 S. Meridian St.
PHILADELPHIA	724 Chestnut St.	ST. LOUIS	411 N. Third St.
			509-511 Market St.

THE MODERN MACHINE SHOP

"As compared with the old-time shop, with its incessant clatter and din," said a shop superintendent, "the modern machine shop might almost be described as noiseless.

"You used to hear in such places a constant rattling of wheels and a more or less continuous pounding. Now you might go through a big shop from top to bottom and never hear a hammer stroke, and instead of a general jangle of sounds you would only hear a smooth, uniform hum; a noise, to be sure, but not half so much in volume as that heard in the old-time shop, and actually musical as compared with it. All this is due to vastly improved modern methods of work and enormously improved modern machines.

"In old times they used to chip and file all flat surfaces. You can imagine what sort of racket such work as that must have made. Then we got the metal planer, which did the work better, and, of course, at far less cost, and which gradually did away with most of the chipping and filing. The planer can screech some now; but that doesn't begin to make the noise it used to, and the noise it does make is not to be compared with that of the chippers and filers.

"The old-time gear wheels were far more rattly and noisy that those of today. Extensively used in machine shops, in one way and another, such wheels were formerly all cast. Nowadays gear wheels for use, where such accuracy is desirable, are made by automatic gear-cutting machines which cut the teeth on them with mathematical accuracy. Such wheels as these are themselves beautiful productions of machine tool work; and when they come to be brought to use they make, of course, with their perfect form and their nice adjustment, one to another, far less noise than the old-time ordinary cogged wheels.

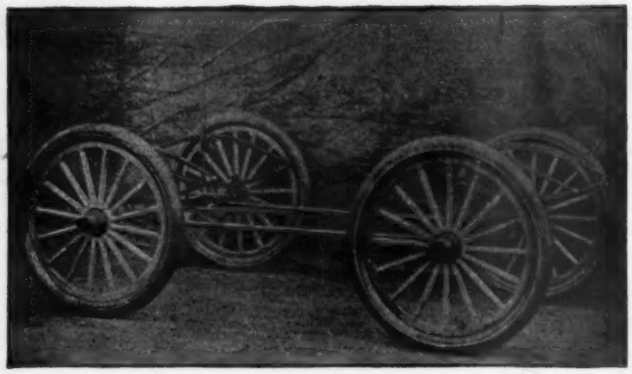
"Another common source of noise in the old-time shop was found in the pounding of work of any sort that was to be turned on arbors in the lathes. There is nothing of that sort, or next to nothing, done in machine shops nowadays, that is, in the shops with modern equipment. Such work is pressed on the arbor, noiselessly, with a compound screw; or by hydraulic power; or by steam power; the work being pressed off the arbor, when finished, in like manner.

"In old times when they wanted to cut off a bar of steel they used to send for the blacksmith and his helper, who would come in with sledges and chisel, and pound away at it. Now they would send such a bar to the cutting-off machine and have it sawed off, with no noise at all.

"Hack saws, of course, are old, but nowadays there are used, for sawing metals in machine shops, lots of power hack saws; these saving a great deal of time, and, incidentally, sparing the shop a whole lot of cold chiseling and hammering.

"In short, the work in machine shops is nowadays more and more of it being done by wonderful labor and time-saving automatic machine tools that are comparatively noiseless in operation; and, in handling the work, power is brought more and more into use, and used more and more noiselessly; and so, with these improved methods and appliances, the modern machine shop is far less noisy than its old-time predecessor."

Automobile Running Gears



Get a running gear that is past the experimental stage and build a SUCCESSFUL AUTOMOBILE

We make two styles complete with springs and wood wheels, solid rubber or pneumatic tires. ∴ ∴ ∴ ∴ ∴

OUR SPRING BLOCK BEARING IS SELF-ADJUSTING

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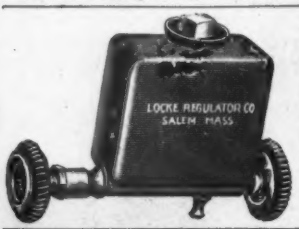

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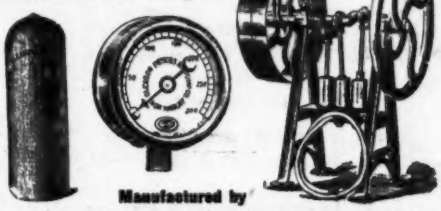

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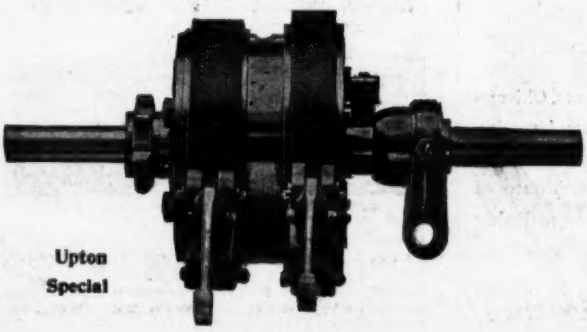

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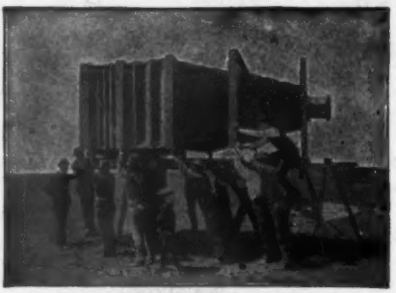

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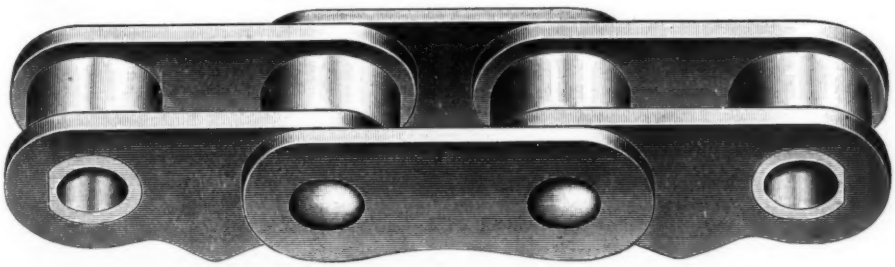

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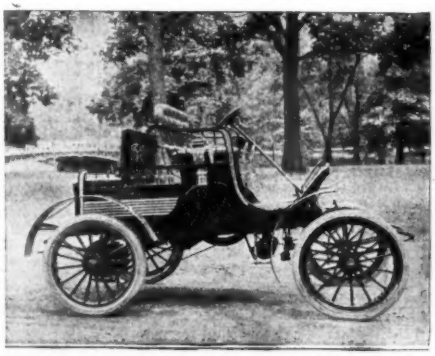

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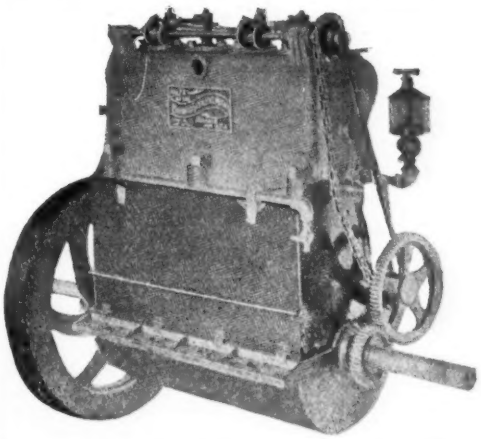

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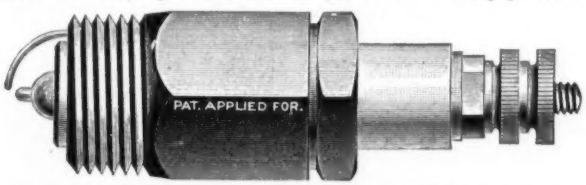

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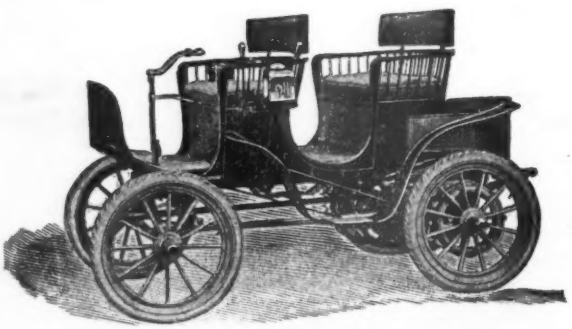

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